AMERICAN FORESTRY

THE MAGAZINE OF THE AMERICAN FORESTRY ASSOCIATION

PERCIVAL SHELDON RIDSDALE, Editor

MARCH 1919 VOL. 25 CONTENTS No. 303

International News Service

EVEN THE RHINE RISES AGAINST THE EX-KAISER!

As if to emphasize the tragic isolation in which that unhappy man finds himself, the house in Holland in which the ex-kaiser has taken refuge is now cut off from the rest of the world by far-spreading floods—and it is the Rhine of all rivers which has thus risen against the fallen war lord of the huns. The photograph shows a magnificent avenue of trees in the rear of the castle, completely flooded, which the ex-kaiser was in the habit of using as a promenade.

Entered as second-class matter December 24, 1909, at the Post Office at Washington, under the Act of March 3, 1879. Copyright, 1919, by the American Forestry Association. Acceptance for mailing at special rate of postage provided for in Section 1103, Act of October 3, 1917, authorized July 11, 1918.

Forest Casualties of Our Allies—By Percival Sheldon Ridsdale 899
With thirteen illustrations.

Thunder Mountain—By Henry S. Graves..... 907
With nine illustrations.

Kiln Drying Oak for Vehicles..... 911

Memorial Trees Planted for Soldiers and Sailors..... 913
With seven illustrations.

In the Furrows of Freedom—By Charles Lathrop Pack..... 918
With ten illustrations.

Philip W. Ayres Elected President of Appalachian Mountain Club 922

The Uses of Wood—Fencing Materials From Forests—By Hu Maxwell 923
With eighteen illustrations.

The Waterfowl—By A. A. Allen..... 931
With nineteen illustrations.

Various Parasitic Plants; With an Owl Story—By Dr. R. W. Shufeldt 937
With eight illustrations.

Crater Lake Shell Hole..... 941

New England Forestry Congress..... 942

Editorial:

Reorganization in Massachusetts 943

Idaho for More National Forests..... 944

"Biddy," an Original Bird—By Clinton G. Abbott..... 945
With two illustrations.

Research Work in Reconstruction..... 946

Forest Research—In the War and After—By Earle H. Clapp.. 947
With three illustrations.

American Lumber for Norway..... 950

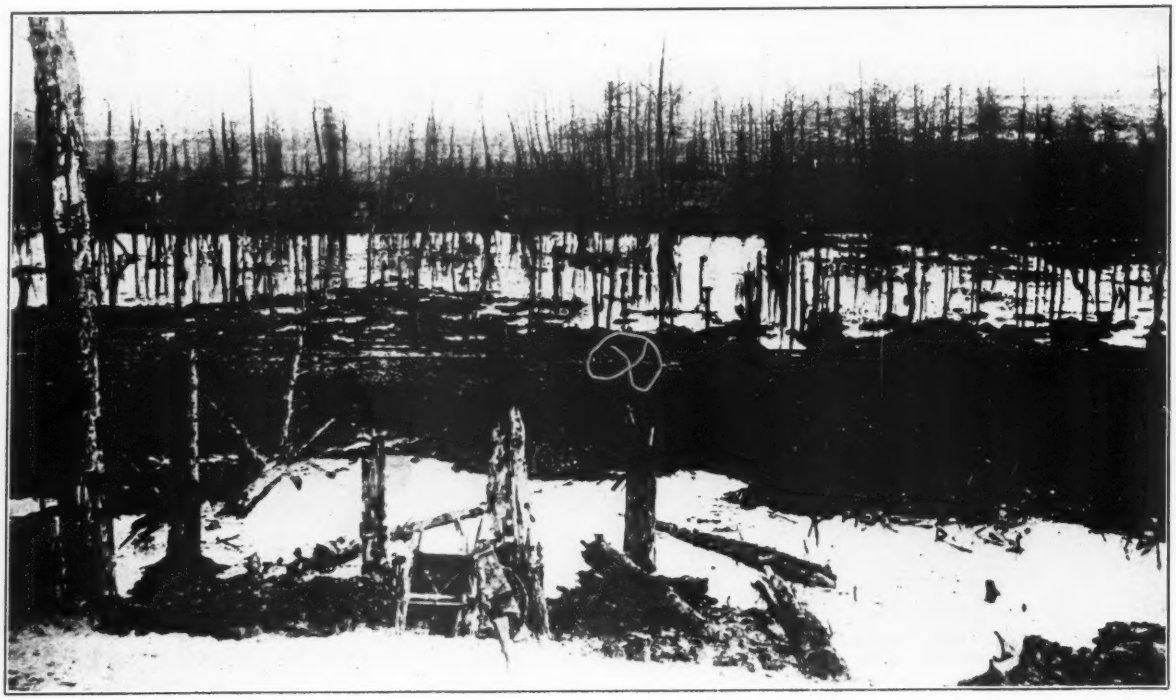
What "They Say" 951

Canadian Department—By Ellwood Wilson..... 952

National Forests Furnish Recreation Worth Millions..... 954

Woodlot May Insure Safe Water..... 954

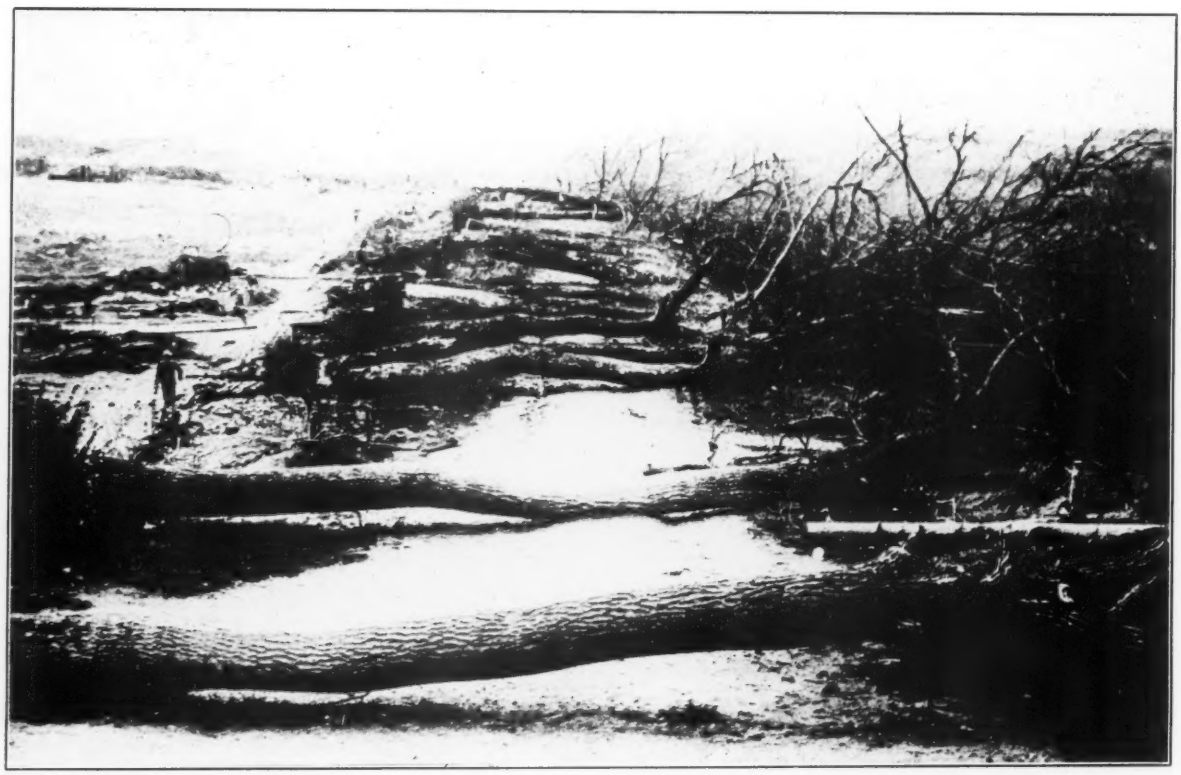
Current Literature 955



Underwood and Underwood—*British Official Photograph*

WOODLAND ALONG THE ANCRE AFTER SEVERE SHELL-FIRE

Through what was left of these woods the British drove the Germans. The trees show the effect of shell and rifle fire of both armies. Few if any of those still standing escaped wounds from shell, shrapnel scrap, machine gun and rifle bullets. The whole woodland will have to be restored, but it first must be cleared of shattered trees, stumps and other debris.



Underwood and Underwood—*British Official Photograph*

ROAD BLOCKED BY FELLED TREES

Thousands of trees were cut down by the Germans to block roads as they retreated and this condition which hampered the British advance near Harrincourt shows how the fine trees which line so many of the roads through France were sacrificed. It will take scores of years to grow others to take their place.

AMERICAN FORESTRY

VOL. XXV MARCH, 1919 NO. 303

FOREST CASUALTIES OF OUR ALLIES

BY PERCIVAL SHELDON RIDSDALE

EDITOR OF AMERICAN FORESTRY

This is the first of a long series of articles on the effect of the Great War on the forests of Europe, articles based on information secured during a tour of Great Britain, France, and Belgium during December, 1918, and January and February, 1919. This trip was taken for the purpose of investigating the war time losses in the forests of these three countries and of ascertaining how best America can aid in restoring these forests.—EDITOR.

Paris, France, January 20, 1919.

THE Peace Conference is to determine how Germany shall supply France, Great Britain, Belgium, and Italy with lumber which these countries lost in the Great War; lost by the cutting of the forests by the Allied armies, the cutting for army requirements or the shipping to Germany for civilian uses by the Germans, and the destruction of the forests and woodlands by the shell, shrapnel and rifle fire of the contending armies.

This action will result in the replacement of actual losses of timber, but it will not restore the cut over and the devastated forests.

The restoration of these forests is the particular mission on which the American Forestry Association sent the writer to Europe, a mission requiring an examination of the forests and woodlands, not only on the battle front, but also behind the fighting area and in Great Britain.

A series of articles on the forest conditions in France, Belgium, Great Britain, and Italy, and also on the work of America's forestry regiments will follow month by month. They will be well illustrated by photographs secured especially for the purpose.

As a result of the inquiries, which established most forcibly the need of reforestation, the American Forestry Association has undertaken the patriotic task of supplying France, Belgium, and Great Britain with a quantity of American forest tree seeds which are to be used in the work of restoring the depleted forests of these three countries. This is an endeavor, gratefully accepted by the Europeans, which may be viewed as an appreciation by the lovers of forestry in America of the sacrifices which the Allied countries made in the vitally necessary task of supplying their armies; and which the ruthless enemy compelled in his lavish use of the forests not only for his army but for his civilians, and often, so it seems, for the purpose of barbaric destruction entirely unwarranted by military requirements. Do these countries need

Underwood and Underwood

ONCE A TREE SHADED ROAD

The path of desolation which remained after the German advance along the Amiens—St. Quentin Road where desperate fighting prevented them from reaching their object, the big supply station of the British at Amiens. Many of these trees were a hundred years old.

help in restoring their forests? It did not require a long examination to make a reply to this question. Belgium has lost practically all her forests. Fifty per cent of the timber and woodlands of England, Scotland, Wales and Ireland has gone, and every tree in Great Britain would have been cut had there been transportation for them to the sawmills, while France with great forest wealth and her forestry system highly developed, lost fully one-tenth of her forests. In the battle-scarred sections of northern France some million and a half acres of forest are today devastated and of little value except as fuel wood while large areas of her forests, governmental, communal and privately owned, have been cut over to supply the needs of the French, American, British, and Canadian armies.

TRENCH AND UNDERGROWTH WHICH SHELTERED THE GERMANS

In Belleau wood near Chateau Thierry where Americans first aided in stopping the last great rush of the Germans the trenches and undergrowth and shell felled trees were over run by the valiant Americans and the Germans driven out after terrific fighting.

France had not only to see her forests destroyed in the actual fighting and in the movement of armies, but had to supply her own army and those of her allies with wood for their numerous military needs. This had to be done because lumber could be more readily secured in France than anywhere else, and France, thanks to her splendidly developed system of forestry, not only was able to supply army requirements but was able, by reason of her forests, to retain her liberty and save her national soul. Had it not been for the defensive value of the forests of northern France, which enabled her to hold back the invaders, and for their offensive value, permitting the secret gathering of large bodies of troops for attack, France would early in the war have been overrun and defeated by the Germans. Her forests saved her and in this one respect alone she is more than amply paid for all her work and all her expenditures on them during the last one hundred and twenty-five years, the period for which a definite forestry system has been in force.

VIEW IN SHOT-SWEPT BELLEAU WOOD

A tangle of wrecked trees, matted undergrowth, massive rocks, wire entanglements and damaged trenches and machine gun nests are to be seen where the marines and other forces of the American Expeditionary Force scored a hard won victory over the Huns near Chateau Thierry. The writer in the lower right hand corner.

Can Germany Repay the Allies?

The ability of Germany to repay, in timber, the losses sustained by France, Great Britain and Belgium has been carefully studied by forest experts of these countries. The result of these studies will be placed before the members of the Peace Conference as soon as the work, which is now under way, is completed. The information for the American delegates is being gathered under the direction of Colonel

C. S. Chapman, of the Twentieth Engineers, who is also to make a report on the forest losses in France and Belgium.

One unofficial report just available as I am leaving Paris is that of Sous-Directeur G. Huffel, of l'Ecole Nationale des Eaux et Forets, who says:

"Our French forests have terribly suffered from the war. The fellings made for the needs of the army, those made by the enemies with an incredible vandalism in the regions which he occupied—just the most wooded parts of the country—have impoverished or ruined them for a long time. As regards the groups of timber located on the front lines, too often nothing remains of them.

DESTROYED BY SHELL FIRE NEAR VERDUN

Such scenes as this are typical wherever there has been an intense bombardment of wooded areas in northern France. Only the skeletons of trees are left and these will rot, decay and fall in a few years.

"This situation is all the more alarming as our needs will certainly increase by enormous proportions. We have to rebuild our houses, our furniture, our machinery. Neither our own resources nor the resources of the world-wide market will be sufficient, by a great deal. It will then be necessary to have recourse to German forests, to take from them all timber we need and which Germany owes, because she ruined us. From the last

Underwood and Underwood

RESULT OF FIRE ON GERMAN DUGOUTS

The targets for the tremendous shell-fire which destroyed the trees in this narrow valley were the German dugouts, the remains of which may be seen on the farther side of the valley. So terrific was the bombardment that the dugouts were destroyed, the Germans driven out and not a tree remains alive.

official statistics, the total area of German forests (not including the forests of Alsace-Lorraine) is of 16,341,700 acres, of which 10,663,700 acres are State Forests, *i. e.*, forests belonging to various States, and 5,677,900 acres belonging to the Communes or to the Public Establishments. These forests are composed, above all, of resinous trees; Scotch Pine covers about half of the area (exactly 47 per cent), and Spruce the fourth part of the total area. Among deciduous trees, the Beech is by far the most widely distributed.

"Statistics show what are, for all classes of forests, the areas occupied by timber of different ages. Thus we can state that there exists, in the bulk of German forests, 7,867,000 acres of timber of more than 60 years of age, which may be used for carpenter's work, *i e.*, as lumber. Half of this area is covered by Scotch Pine, more than the fourth part by Beech, and a little less than the fifth part by Spruce.

"If, not considering the bulk of German forests, we prefer only to consider forests belonging to different States, we find that Domaniales forests contain 4,032,000 acres of timber of more than 60 years of age. To this quantity may be added 63,950 acres of Communal Pine timber located in the Grand-Duche de Bade and in Wurtemberg. On this basis, it is easy to state what volume of lumber is immediately available, in the State forests. This volume is at least 338 millions of cubic meters. More than the third part is Scotch Pine which is excellent timber for lumber, the fourth part is Beech which can be used for lumber, and for railroad ties. Spruce and Fir will produce three millions of plain boards. Oak will also be welcomed by our cabinet-makers and carpenters who fear the lack of this raw material.

Underwood and Underwood

CONDITION AFTER A BATTLE

The destruction in this small patch of woodland was caused by an attack by the Germans on a British position. The Huns were driven back with heavy losses, but not before the concentrated fire from both sides cut the trees in the fighting area to pieces.

"The value in money of these 338 millions of cubic meters of standing timber will amount to 5,400,000,000 francs ($1,000,000,000) if we take as a basis the sale prices realized during the last ten years in the bulk of German State forests. At the present rate, the value will be double and more, and perhaps triple. The material coming from the Communal Fir timber of the Grand-Duche de Bade and Wurtemberg, represents eight millions of cubic meters able to produce 250 millions of boards valued at the pre-war rate about 200,000,000 francs ($36,700,000) on standing, and more than the triple at the actual rates.

"How many labor days will be necessary to market those 350 millions of cubic meters of timber, and how many years will this work take? Is the world-wide market able to absorb without trouble this enormous quantity of products?

"The first thing to do is to forbid or at least to seriously regulate and reduce, during the period of realization of this material in State forests, any other felling of timber on the territory of the Empire, in order to reserve the forestry labor available in Germany. This point being agreed upon, it is easy to calculate that to fell and manufacture the stock of lumber from German Public forests, 100 millions of labor days, plus the indigenous labor, will be necessary. To clean up this work in a year's time, this means to get 330,000 workmen, and this seems impracticable. If we prorate the felling for a period of five years, a body of 50,000 foreign woodsmen in connection with indigenous foresters, will be quite sufficient.

"There is no doubt that timber thus spread over the market could be easily absorbed.

"Before the war, in fact, France had to buy in foreign

Underwood and Underwood
AFTER BEING STRUCK BY A SHELL
A tree struck squarely by a shell as this was by a 75 m. shell is usually torn into splinters. This one stood near Vitry le Francois.

countries, five millions of cubic meters of lumber, and the United Kingdom bought more than fifteen millions of cubic meters. The latter received prodigious quantities of mine props furnished by our pine timber in the Landes. At the present time, the forests in the Landes will not be able to furnish any timber for a period of years. Furthermore, the export of timber from Russia, which supplied a large part of the needs of the British, will now be reduced or suppressed for a long time. Our Allies of the United Kingdom will then have to take for their own needs a large part of the enormous felling to be made in Germany.

"Besides we must consider that the Germans themselves, especially after we shall have issued orders to forbid any other felling that may interfere with our own operations, as mentioned above, could be authorized to receive part of the products of the felling in case some timber would remain unnecessary for our allies and ourselves. Probably we would not refuse to cede them some timber, eventually, at a reasonable rate."

Forestry Losses in France

French soil having been the chief battle ground it is proper to first of all consider the forest conditions and plans for restoration of her forests.

The total area of the French forests situated in the fighting zones and in the regions which were long occupied by the enemy, or subject to his fire, has been estimated in round numbers at 1,482,600 acres.

The principal varieties of trees which make up these forests are as follows:

Among the deciduous trees: The Common Oak (*var. Quercus sessiliflora* and *Quercus pedunculata*), the Beech (*Fagus sylvatica*), the English Hornbeam (*Capinus betulus*), the Ash (*Fraxinus excelsior*), the Elm (*Ulmus campestris*), the Birch (*Betula alba*), and the Alder tree (*Alnus glutinosa*).

Among the indeciduous trees: The Fir (*Abies pectinata*), the Norway Spruce (*Abies* or *Picea excelsa*), the Scotch Pine (*Pinus sylvestris*) and the Black Pine of Austria (*P. laricio Austriaca*).

These varieties are scattered very differently according to the regions. The deciduous trees predominate in the north of France (Departments of the North, of the Somme, of the Pas-de-Calais, of the Aisne, of the Oise, of the Ardennes, and of the Meuse). On the contrary in

Underwood and Underwood DAMAGED CAUSED BY ONE SHELL
One shell, a large one, struck this tree and the photograph shows its effect. Thousands of trees in all forested fighting areas were struck squarely during the storm of shell-fire and were destroyed in this manner.

Underwood and Underwood

FOREST VALUABLE FOR OFFENSIVE OPERATIONS

Three artillery pieces and one French artillery officer are to be seen in this heavily wooded section of the Argonne Forest, but so well camouflaged are the pieces that they are not visible at a short distance unless the observer knows just where to look for them. In woods such as these it is easy to conceal thousands of troops so well that the enemy airmen cannot discover them. One hundred and fifty-five pieces of artillery were concentrated at this place.

the East the fir and the spruce constitute the greater part of the woods in the mountainous part of the Department of the Vosges; and, in the chalky plains of the Champagne (Department of the Aube and of La Marne), the Austrian black pine is very common.

The principal forests belonging to the Government which are not in the regions in question are:

Mormal, 22,649,186 acres; Nieppe, 5,728 acres; St. Amand, 8,191 acres; St. Michel, 7,568 acres; Chateau-Regnault, 13,397 acres; Signy, 7,860 acres; Sedan, 9,496 acres; Moyeuvre, 5,189 acres; Compiegne, 22,239 acres; Laigue, 9,439 acres; St. Gobain, 7,904 acres; Retz, 14,826 acres; Coucy-Basse, 5,322 acres; Lachalade, 5,436 acres; Spincourt, 5,189 acres; Lisle, 6,671 acres; Sommedieu, 4,942 acres; Les Elieux, 5,189 acres; Parroy, 6,424 acres; Bois-Sauvages, 5,310; Valde Senones, 10,331 acres; Rambervillers, 13,679 acres.

The forests belonging to Communes or to private individuals are:

Mazarin, 7,029 acres; Sauton, 5,169 acres; Boux, 17,222 acres; La Fague, 10,827 acres; Nouvion, 9,234 acres; Ban Lemonie, 11,633 acres; Valtin, 3,867 acres.

It is very difficult to estimate at present, with any accuracy, the area over which the forests in these regions have been devastated, the methodical and detailed examination of these ravages being still under way by the forestry department of the French Government, consequently it is impossible to determine with precision the area on which the work of reforestation is to take place.

Moreover, independently of the wooded tracts which were more or less completely destroyed and which are to be totally or partially reforested, it is proper to take into consideration the agricultural lands which, having experienced a tremendous upheaval from artillery fire, mines, or works of defense will no longer be utilizable except through reforestation.

At all events it does not seem to be exaggerating to estimate at 741,300 acres the total of the lands on which work of reforestation will have to be undertaken, 494,200 acres of forest lands and 247,600 acres of agricultural lands having been ruined.

They will be reforested, as the case may be, either by planting or seeding. The nature of the land and its condition on the surface, the nature of the forest trees to be employed, and on the other hand the labor resources will involve the choice of one or the other of these methods.

It may be estimated that the area planted will be 444,780 acres and the area seeded 276,520 acres, which will necessitate, altogether, the use of 720,000,000 saplings and 1,851,864 pounds of seed of different varieties, or 72 million saplings and 185,186 pounds of seed per year, assuming a period of ten years as necessary for the execution of the work.

Native trees will naturally be utilized for the great majority of the forest areas to be created, and among them the oak, the beech, the ash, the fir, the spruce, and the Scotch pine will occupy a preponderating place.

It is certain, however, that France may use to advantage, in a certain measure, foreign varieties which have already proven successful in France, and this enabled the Administration of Waters and Forests to accept with gratitude the offer of the American Forestry Association to place at its disposal seed of American trees to help reconstruct the French forests.

If among these seed there are some, such as those of the Douglas fir and the Weymouth pine, to which France gives a very marked preference, it is owing to the following reasons:

The Douglas fir, *Pseudotsuga Douglasii,* known in France as the "Sapin de Douglas," was introduced there in 1826; and it has thus far proven there to be hardy under all conditions, the great cold of 1879-1880, 13° below zero, not having affected it. Placed in an environment which suits it, it prefers somewhat cool silicious soils, it grows rapidly and is capable of giving good yields. It is a variety destined to have an assured future in France as a forest tree. Fine masses of it are now found in the center of the country, particularly in Sologne.

The Weymouth pine (*Pinus Strobus*), the Pine of Lord Weymouth, is of no less interest to France. Its introduction in Europe is very ancient, being said to have taken place in England toward 1705 through Lord Weymouth. Although of very great hardiness and rapid growth, it spread at first very slowly on the old continent; but after about 50 years its use greatly developed. It was introduced advantageously in moist and even peaty soils, particularly those of the Vosges, where it gave exceedingly satisfactory results.

Cultivated on lands which suit it, that is, on cool soil which is of a silicious or clayey nature preferably, it grows with great vigor. It is a fully settled fact at present that this species is also capable of being employed successfully in France in the reforestation of certain lands.

France Accepts Help

Following a trip to the battlefields, principally those upon which the Americans fought, the writer had the pleasure of presenting to the French Government officials the offer of the American Forestry Association to provide France with American tree seed to reforest not only sections of devastated forest land but for use

Underwood and Underwood—*British Official Photograph*

A COMBINATION OF DESTRUCTION

The Huns not only destroyed by fire this fine old Chateau in the Flanders section of the battle front, but cut down all the fruit and ornamental trees surrounding it. Their explanation might be that of military necessity, but to the civilian it looks much like wanton destruction.

Underwood and Underwood—*British Official Photograph*

WRECK OF A WOODLAND NEAR LE BARQUE

Wherever trees were subjected to concentrated artillery fire the result was much the same as indicated by this photograph. Almost invariably some remained standing but all are so badly wounded that they will die.

on agricultural land so badly torn by shell fire that it is no longer of agricultural value. Such land may ultimately be restored for agricultural purposes after being planted as a forest for nature then may very gradually heal the scars of war.

At the conference held in the Ministry of Agriculture in Paris were M. Dabat, Directeur General des Eaux et Forets au Ministere de l'Agriculture; M. Leddet, Conservateur des Eaux et Forets au Ministere de l'Agriculture, Chef du bureau des reboisements; M. Eymeri, Conservateur des Eaux et Forets au Ministere de l'Agriculture, charge du service des exploitations forestieres de guerre, representing the French Government; Major Theodore S. Woolsey, Jr., Chief of the Paris office of the forestry section of the American Expeditionary Forces; Capt. Maurice Fresson, liaison officer, and the writer.

M. Dabat with many expressions of gratitude accepted the offer and later in an official letter of acceptance, said:

"I am highly appreciative of the kind offer which you have made to me on behalf of the American Forestry Association and according to which the latter proposes to place at the disposal of the General Bureau of Waters and Forests considerable quantities of American forest seed to help replenish the French forests devastated by the events of the war.

"With deep gratitude do I accept the generous collaboration of your Society in this vast work which is so necessary in order to restore the painful ruins accumulated on our soil as a result of the terrible war in which the American nation contributed so powerfully and so valiantly toward bringing to a glorious conclusion.

"I therefore have the honor to request you to express my sincere thanks to the American Forestry Association.

"The American forest seed capable of being used to advantage in the proposed reforestation are primarily those of the Douglas fir (*Pseudotsuga Douglasii*) or Oregon pine and of the Weymouth pine (*Pinus Strobus*), which have proved successful in our country and can be utilized there to a considerable extent.

"Besides them, we should be interested in receiving small quantities of the blue variety of Douglas (Colorado Douglas fir), of *Pinus monticula* (Western White pine), of *Pinus resinosa* (Red pine or Norway pine), of *Larix occidentalis* (Western Tamarack), and of *Picea Stichensis* (Tideland spruce), all being varieties whose use cannot really be rendered general until experiments have been made with them in nurseries or on small areas."

These facts, together with information about conditions in Great Britain, Belgium and Italy have been forwarded to the Board of Directors of the American Forestry Association, and are to be presented to the members of the Association. Later plans for the collection of the seed needed by the Allies will be considered and announced in the magazine.

THUNDER MOUNTAIN

BY HENRY S. GRAVES

CHIEF FORESTER, UNITED STATES FOREST SERVICE

IN THE high mountains of Central Idaho there is an area of over a million acres that tells the story of what would have happened in the western mountains if the National Forest system had not been established. It is an area of public land, rich in forest, mineral, water,

THE THUNDER MOUNTAIN REGION IS A VAST WATERSHED

An important source at the headwaters of the Columbia River. The streams are swift, and there is an immense amount of potential water-power in the region.

and grazing resources, in which abuse by fire and overgrazing has wrought such havoc that the whole region is becoming a menace to both the local and the general public. It is surrounded by National Forests, in which for over twenty years there has been protection from fire, careful regulation of grazing, progressive development of trails and other improvements, and a foundation of industrial upbuilding and prosperity.

The Thunder Mountain country was not included within the National Forests because of local opposition. Within the area are valuable mineral deposits, and just prior to the establishment of the National Forests in Idaho there was a stampede of miners from all parts of the West into that region. Thousands of sanguine prospectors poured in, and mining camps sprang up as if by magic. A beginning was made in building roads, trails, and bridges. Money was lavishly spent, merchants prospered mightily, and Idaho regarded the Thunder Mountain region as a future center of great industrial development. It was feared at that time by many people in Idaho that the existence of the National Forests might operate to retard mining development, and the public sentiment against including Thunder Mountain in a National Forest was so great that it was left as open public land unprotected and subject to the abuses of unregulated grazing of sheep.

The region now stands out in striking contrast to the surrounding National Forests. While in the Forests the resources have been saved and are being progressively developed, the Thunder Mountain region is being rapidly ruined, industrial development has practically stopped, and unless steps are taken at once to bring this

TIMBER OF ECONOMIC IMPORTANCE

The dense Lodgepole Pine makes an admirable soil cover. It also produces material of great importance in mining.

area under protection and control of the public, Idaho will not only have an unproductive waste but will suffer seriously through injury to an important water system.

The mining boom collapsed when the more available mineral pockets were exhausted, and when it became

apparent that permanent development could come only with the importation of large quantities of heavy machinery for the purpose of working deep mines.

AN ABANDONED MINING CLAIM

In boom times the miner built his cabin at a point conveniently near his claim, living on in the hope that the country would be opened up. Most of them have abandoned the country, and development must wait until the area can be added to a National Forest and roads built to the mines.

There was required the construction of roads to make possible the opening up of the rich mining resources of the region. This was impracticable without Government aid, and the area was shut off from possible aid of the road funds appropriated for the improvement of the National Forests. Then the miners drifted away to newer points of interest, leaving deserted towns and prospect works as witness of the former mining activities. The region became almost depopulated. The old roads and trails which had been built have been largely washed out and destroyed. Forest fires, which in the early days were often set by prospectors to clear off the ground in order to make exploration more simple, destroyed millions of feet of timber. Lightning and carelessness also started many fires; and from year to year great areas were burned over, the fire rapidly destroying forests which were of great prospective value for lumber and for the needs of mining and other local development. Not less than 300,000 acres in this region have been burned. Timber with a potential value of at least a million dollars has been destroyed, and the process of attrition by fire is going on each year, so that in time, if present conditions continue, a great resource will have been wiped out. The region has become, too, a constant menace to the surrounding National Forests because of the danger that the fires, gaining headway under strong winds, may sweep over into the timber which the public is endeavoring to safeguard.

But the most serious aspect of the present situation is the inevitable injury which is already seriously threatening an important element of the headwaters of the Columbia River. The Thunder Mountain region is of unusual importance as a source of water. It is a high mountainous region, ranging in elevation from 3,500 to nearly 10,000 feet. Most of it is above 6,000 feet, which means that there is a comparatively heavy precipitation. Of special importance is the fact that the snowfall is heavy, normally remaining until late in the spring or early summer. The mountains are broken and rugged and the slopes for the most part steep. While there are many rugged peaks and lofty ridges, most of the area is not above

A TOWN THAT IS NO MORE

The town of Roosevelt was a prosperous mining village, typifying the hope of the prospectors who in the early days rushed into the Thunder Mountain country. In 1907 the town was wiped out as the result of a landslide that dammed the river and flooded the valley.

timber line. In fact fully 85 per cent of the land originally was covered with forest of greater or less density.

The natural forest on this rugged mountain area is typical of the upland regions of central Idaho. In places there are even today fine stands of yellow pine and Douglas fir. It is not uncommon to see trees four or five feet in diameter. Along the streams one finds abundant Engelmann spruce, while the most common tree is the lodgepole pine, occurring in some places as dense pure stands and elsewhere in mixture with yellow pine, spruce, and Douglas fir. Then at the higher elevation, just as elsewhere in the Rocky Mountains, one encounters Alpine fir and white-bark pine. It was an admirable forest. It formed a protective cover for the steep slopes and narrow ravines and canyons, and safeguarded the regularity of the waterflow.

TREE GROWTH PERSISTS

Even the steepest slopes are capable of supporting trees. The character of the soil and steepness of the slopes make it essential that the slopes be protected by as much forest growth as possible.

The region is one vast watershed. Innumerable streams distribute water in great quantities into the tributaries of the Columbia River. The supply of water is estimated at a minimum of approximately 1,000 second feet. Many of the streams have a rapid flow, averaging about 100 feet to the mile, and it has been estimated by some that there is potential waterpower in excess of 100,000 horsepower, which ultimately can be generated.

The watershed is being ruined. This is partly through the great destruction of the forests, with the inevitable effect on the rapidity of the melting of the snow in the spring. More serious, however, is the injury to the ground surface by the excessive and utterly unregulated grazing of sheep. If this area had been under careful regulation, it might be possible to graze upon it as many as 75,000 head of sheep without injury to the watershed and without injury to the productiveness of the forest. Increasingly, stock men have been rushing sheep on this area, absolutely regardless of the effect of the over-grazing on the forest range itself or upon the watershed. During the past season it is estimated that there were about 300,000 sheep ranged on the area. Not only is this overgrazing destroying the better grasses, but the soil is being rapidly washed away. Gullies are being cut that already are from one to two feet deep and which with every flood are being scoured out to a greater width and depth. Portions of the area are described by forest officers as practically a dust heap. It is said that

SLOPE RISING ABRUPTLY ABOVE A STREAM

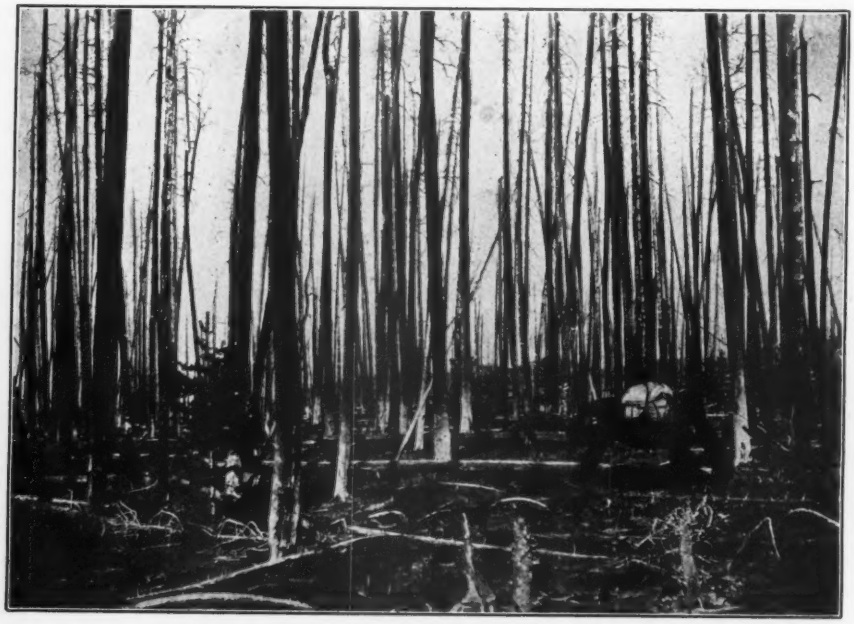
These slopes today are being burned over by forest fires. Over-grazing by sheep is already starting myriads of gullies which promise to have a serious effect on the stability of the waterflow.

the southern end of the area is so devoid of forage suitable for horses that practically nothing can live there except sheep and that during the past season the sheep themselves were forced to eat grasses and plants that they are never known to eat except in extreme cases. The actual effect of the destruction of the timber and of the overgrazing is already noticeable. On one important stream the high water period is at least one month earlier than on streams in the National Forests, under precisely similar conditions, where the watersheds are protected.

It is not yet too late to save the Thunder Mountain country and to make it a source of wealth and general public benefit to the State of Idaho and to the country. There is still upon this great area an aggregate of between two and three billion feet of timber; and while the timber is comparatively much less accessible than a great deal of other timber owned by the public and by private individuals, it will nevertheless ultimately be of great importance. Its destruction would be a calamity. When the National Forests were put under administration there were other areas which had been greatly overgrazed. The placing of the Thunder Mountain region under strict grazing regulations would make it possible within a few years to begin the restoration of the natural grass cover, which, together with the forest, is indispensable to the protection of the watershed. The development of the great mineral resources of this region is hopelessly blocked until the area is incorporated into a National Forest system so that roads can be built. The protection of the forests, the regulation of the grazing, and the building of trails and other improvements would set in motion a progressive development of the region in contrast to the present progressive devastation.

PICTURESQUE WHITE-BARK PINE

The white-bark pine grows on precipitous slopes and is of value in holding the soil. It often assumes a most picturesque form.



FIRE SWEPT AREA

Fully 300,000 acres of forest has been burned and the public has lost timber having an approximate value of not less than a million dollars. The dead trees stand for a time after a fire, then are blown down and furnish fuel for additional fires, which finally wipe out all tree growth.

There is but little land suited to agriculture. There are a few farm homesteads, but so far it has been possible for homesteaders to clear and put into cultivation only slightly over 400 acres. It is believed by careful observers that there is probably not more than an aggregate of 4,000 to 5,000 acres which could be farmed. These lands occur in scattered patches. It is certain that there will be little development of them until the mines and other resources can be opened up in such a way as is possible under the National Forest system.

Not to be overlooked among the resources is the wild life which abounds in this region. Game is plentiful and there are reported to be many mountain

sheep and goats. Certainly no better fishing could be found anywhere.

Adverse public sentiment was responsible in the early days for excluding this area from the National Forests, and hence for the serious condition which has followed. Public sentiment has changed. There is now a demand among the people of Idaho that this area be made into a National Forest. The present sentiment in Idaho is well expressed by a resolution passed by the State Legislature in 1917, in which there was only one dissenting vote in each of the two Houses. The sense of the Legislature regarding the value of making this area a National Forest is expressed in one of the clauses of the preamble as follows:

"The inclusion of the said area within a National Forest would eliminate the annual destruction of timber by forest fires; make it possible for homestead settlers to secure title to their lands under the forest homestead act of June 11, 1906, without expense to them other than entry and final proof fees and without the necessity of awaiting public land surveys; would bring Federal aid in the construction of wagon roads, trails, bridges and telephone lines; give adequate protection to the game animals, birds and fish; establish a system of regulated range use, thus conserving and perpetuating the forage resources for the benefit of the local residents and taxpayers; make it possible for the State to realize upon its equity in the lands by relinquishing the unsurveyed school lands (Sections 16 and 36) and selecting more valuable lands elsewhere; increase the revenues of the county and State through the receipt of 35 per cent of the gross receipts collected by the Forest Service; enlarge the power of the State to share in the benefits of the Federal aid road act; and otherwise assist in opening to development and use the vast material resources of the Thunder Mountain region."

It was affirmatively recommended in the last annual report of the Forester that this area be comprised within the National Forest system. It would not be a great financial burden to the Nation because it would be possible to deprive from it immediately a certain revenue through the fees for grazing the number of stock which could be permitted even under present conditions, and this would go far to cover administrative costs. A great mistake was made in the first place. The consequences of that mistake are already serious. It is essential that the public take action immediately to prevent further injury and to make the area in question of public service rather than increasingly a public injury.

A MOUNTAIN MEADOW

Typical scene in a mountain meadow, backed by ridges, covered with forest. This picture was taken fifteen years ago. Since then hundreds of fires have been depleting the forest resources of this region.

KILN DRYING OAK FOR VEHICLES

ONE of the distinct developments of experiments conducted at the Forest Products Laboratory at Madison, Wisconsin, during the war was a rapid method of seasoning oak.

It requires from two to three years to air season heavier oak wagon stock. Better stock has been secured by drying this heavy green oak according to Forest Service recommendations and the time for 3-inch material green from the saw is reduced to 90 or 100 days.

Three large plants using this system have negligible losses and as compared with losses at plants using other methods, ranged from 10 per cent up to complete loss. Where there were heavy drying losses there was heavy pressure for relaxation in inspection, so that poor drying meant not only an excessive loss of stock and a holding up on deliveries but probably also poorer material in wagons.

One furniture plant with orders for spare parts that followed improper drying methods is reported to have lost $25,000 worth of stock on one run, stock which was being depended upon to keep the force at work.

Photograph by Harris and Ewing

BEAUTIFUL TREES SURROUND THE UNITED STATES CAPITOL

Though markers and monuments of bronze and stone will doubtless be erected in many places to our heroic dead—our boys who fought and bled that Justice, Truth and Liberty might prevail in every land, they will not be all. A more significant meaning is found in the planting of Memorial Trees, standing as constant reminders to the people of America of that love of freedom, light and life for which our soldiers offered their service and their lives. And again such trees may well supplement the marble arch or monument, furnishing the needed artistic setting, a point well demonstrated by this picture of the trees around our National Capitol at Washington.

MEMORIAL TREES PLANTED FOR SOLDIERS AND SAILORS

WHATEVER memorial is erected to honor the American soldiers and sailors who gave their lives for liberty, should be, in every sense, worthy of the deeds they performed. This means, for one thing, that it should be of lasting value, just as the results of the victory they won will be an enduring blessing to the human race. It means, in the next place, that there should be about this memorial a lofty and sentimental appeal, in keeping with the principles of Justice, Truth and Liberty for which these men fought and died. In the third place, the memorial should be a living, growing monument which will increase in strength and meaning with the passing of the years and with the growing power of democracy.

What more fitting tribute, then, to America's heroes than groups and rows of trees and individual trees in their home communities. They can be planted along the streets and avenues and highways, in parks and plazas, church and school yards and home grounds and in other places. They will stand as a constant expression to the people of America of the love of freedom, light and life for which our soldiers offered their lives and their services. As they grow and expand, with their branches reaching upward toward heaven, they will speak daily of the growing and expanding life which they protect. Whatever other forms of memorial are decided on, therefore, nothing can be more appropriate than tree planting. This is true for a number of reasons. Trees are a protection to life and innumerable are the uses to which man puts wood, ranging from the ships which cross the ocean to the house he builds over his head.

Widespread approval has been voiced of the suggestion put forth by the American Forestry Association that cities, states and communities, no matter what other memorials are erected, adopt the setting out of trees, in commemoration of those sons of whom they are so proud. And this honor should not be confined to those who paid the supreme sacrifice. It should be made to include as far as possible all those who entered the service of their country and who stood ready to back to the limit the cause of the United States and its Allies, Governors of many states and numerous other officials, civic bodies of various kinds, women's clubs and others have expressed themselves as in hearty accord with the idea, and this backing may be counted on to push through any plans in this direction which are worked out.

Photograph by Drew-Bynum-Peters

PLANT MEMORIAL TREES FOR THREE WHO DIED IN SERVICE

Three memorial trees were dedicated Sunday afternoon at 2.30 o'clock in front of the first city playground in South Canal Street, Newark, in memory of three young men who died in the service. The three thus honored were: James V. Marzano and Oscar Sager, who made the supreme sacrifice on the battle-front, and Frederick Sauchelli, who died in the navy. The three trees bore memorial wreaths and other decorations. Mayor Gillen delivered the dedication. The exercises were under the direction of Director Joseph Esposito, who sent invitations to young men in the service, home on furlough, to assist. Music was furnished by the Police Band. (*From the Call, Newark, New Jersey.*)

Markers and monuments of bronze and stone doubtless will be erected in many places. This will not prevent the carrying out of the tree-planting idea. In most cases trees will serve as an artistic and needed setting to be used in conjunction with some other memorial. If an arch or building is erected, trees can be arranged

at appropriate distances around it or used along avenues and roads leading to it.

It seems, however, as if the service and the sacrifice of America's sons in this great war call for something more significant, something different from the customary

A LIVING, GROWING MEMORIAL

Walnut trees will not only furnish shade and add to the beauty of the landscape and the nation's future timber supply but to its food resources also. Planted individually along roadsides or elsewhere, or in groves, they will stand as perennial reminders of the full measure of service paid by America's sons who fell in France.

marble and bronze. There are many reasons why trees are most appropriate memorials for these men. It was the trees of France which played a large part in helping to hold and finally drive back the Hunnish hordes. France sacrificed her forests, as she did her sons, that right and justice might prevail. In this connection both the sentimental and the practical value of tree planting must be recognized, for it is helping to make up for the awful losses of devastation at the same time that it is a living, growing memorial.

It was due to the careful planting and conservation which had been practiced by the French for many years previous to the war that, when the time came, her forests were able to supply the vast quantities of wood which was needed by the Allies for a thousand purposes. This should be a great lesson to the United States. Its forests constitute one of its greatest sources of wealth and depletion must be overcome by new planting.

The practical patriotism which is exemplified in the planting of trees as memorials is emphasized by the suggestion of Agnes Mildred Brennen, of Niagara Falls, New York, who voices the opinion that nut trees be grown, thus combining food value with that of shade, artistic beauty and future timber supply. In this connection she says:

"During the last four years more people of Europe have died of starvation than were killed in the war. We were called upon to feed the Allies, and this meant conservation of all food products. Now that peace is at hand we are not held strictly to a limited amount of any one commodity, but we are not morally released from conserving. Europe must be fed and it is plainly our duty to furnish the food; not for a year or two but until that time when she will be able to raise her own food. The motto of the Hun was, 'Destroy Everything' and this he did most ruthlessly. We then, must adopt for our slogan the motto of the war kitchens, 'Save Everything.' We must now have our Victory Gardens and make every available piece of ground work for the cause of democracy.

"The number of our native nut trees has diminished during the past few years, while the quantity of nuts consumed has steadily increased. The war has laid waste the nut orchards of France and Italy and we can no longer import from these countries. Why then, when planting trees in commemoration of the deeds of our heroes, would it not be wise to plant a goodly number of those trees which will not only serve as a fitting memorial to our honored dead, but also furnish food for

THE BITTERNUT HICKORY

This beautiful tree grows throughout the United States all the way from the Canadian border to Florida. It is one of a number of varieties. According to the American Forestry Association there are no hickories growing in a state of nature outside of North America.

suffering humanity? It is unnecessary to elucidate upon the value of nuts as food, which well understood by the majority of people and is constantly becoming recognized by the people in general. Most nut trees require less care than ordinary fruit trees and are longer lived.

"'When you plant another tree, why not plant an English Walnut Tree?' Luther Burbank says, then besides sentiment and shade and leaves, you have a perrenial supply of nuts, the improved kind of which furnish the most delicious, nutritious and healthful food which has ever been known."

The oak, "symbol of strength," is suggested by the North Carolina Geological and Economic Survey, which in a statement commenting on the memorial tree plan says:

"What more fitting memorials could there be than trees! Not monuments in stone, never changing, indifferent alike to the seasons, and the care of loving hands; but beautiful young trees, growing ever upward and outward toward the light, like the souls of those whom we seek to commemorate and responding daily to the care bestowed upon them.

"The ideal tree for this purpose is one that will thrive in most situations, is resistant to disease, will live long, is beautiful in youth and will be still more beautiful in age. Such is our American white oak. It grows slowly, but no tree arouses such genuine admiration, affection and inspiration. Some other oaks, such as the willow oak, red oak, pin oak, live oak, and others are ideal for the different parts of North Carolina in which they are native, but the white oak thrives all over this State and in fact over practically all the eastern United States.

The stately pecan on the beautiful lawn at Mt. Vernon-Washington's Home

Courtesy of the Maryland Nut Nurseries

"Let us plant oaks, the symbol of strength—and one might almost say of immortality—as memorial trees, not only singly on school or home grounds, but in parks and more particularly in avenues along our important roads, making our ways beautiful with their living beauty and keeping alive the sacred memories of those whom we love and shall always delight to honor."

Memorial trees already have been planted in a number of communities, some by individuals, others by churches, clubs and other organizations; and plans are being made in many other places to follow out the American Forestry Association's suggestion. It is most gratifying to note the prompt and wide response to the idea. A number of the states through their forest or their highway commissions are furthering the movement in a big way and preparing to plant entire forests, groves in the various counties and thousands of trees along the main roads. In co-operation with the American Institute of Architects, Portland, Oregon, is working out a comprehensive victory memorial project which includes beautiful parks with trees, a Liberty Temple, memorial hospital and a broad central driveway, with trees on either side and smaller roadways, leading to the State Capital, with wooded parking in other portions of the scheme.

The plan outlined for St. Louis by the local chapter of the American Institute of Architects provides for a cross-town park system, with Chateau Thierry and St.

Mihiel Parkways, Wilson, Pershing and Lafayette Circles, connecting with existing parks and making a comprehensive municipal improvement feature. It is suggested that one of the parkways be named "Argonne Forest," while a connecting plaza be named "Avenue of the 138th" in honor of the St. Louis National Guard Regiment which was in France.

Atlanta, Georgia, has selected April 6th, the anniversary of this country's entrance into the war, as the date for the planting there of trees in honor of the heroes of that city and Fulton County. The War Mothers of Atlanta have arranged for this dedication. The Atlanta Writers' Club has planned to set out a grove of trees in honor of prominent Georgia authors; and the first to be so honored is Jacques Futrelle, who was lost on the Titanic.

ing to the Association on this subject, George Bird Grinnell, of New York, approves of the idea for a memorial park or parks in Colonel Roosevelt's honor, as well as of the plan for memorial trees for soldiers and sailors.

The Pittsburgh Chamber of Commerce has adopted the idea of planting trees there for Alleghany County's soldiers and sailors who died in the war. The Elyria (Ohio) Rotary Club has decided to plant maples along the drives in the Memorial Hospital grounds, one for each native son who was killed. John Poole, president of the International Association of Rotary Clubs, speaks of the memorial trees as "living and loving tributes" to the memory of America's heroes. In Fort Wayne, Indiana, the department of public parks has purchased 150 trees for a memorial park.

Photographs by courtesy of D. N. Pomeroy

THE END OF A PERFECT DAY

Beauty and the Beast have been busy filling up the baskets and sacks with walnuts and they seem to have made a very successful haul. While "Maud" will not share in the feast, there are enough of the delicious, nutritious nuts for many children to enjoy along with the little lady shown in the picture. When planting trees in honor of the nation's heroes who served or who fell in the great war, why not set out walnuts or some other equally valuable food-producing tree which will combine a practical with a sentimental value?

The tree planting day which is to be observed this spring by the Sharon Community Center, of Farmington, Iowa, is to be known as "Roosevelt Day." Thus, at the suggestion of the American Forestry Association, the man who occupied such a prominent position for having made conservation a live issue in the United States, is to be paid a tribute which would have appealed most strongly to his nature-loving heart. In many places throughout the country they are planning to honor Colonel Roosevelt's memory by tree planting. In writ-

An American elm for every Ramsey County, Minnesota, son who paid the supreme sacrifice, is to be planted in Linwood Park, St. Paul. Worcester, Massachusetts, is considering the placing of a row of trees along Green Hill Park Driveway leading out to Camp Bartlett, where the boys from that city trained in the early days of the war. Clinton, Massachusetts, is planning a park of trees in the heart of the city. At Fort Worth, Texas, the men who trained at Camp Bowie are to be remembered by trees along two avenues leading

out to the camp. The City Federation of Women's Clubs is back of this movement. There has been introduced into the legislature of South Carolina a bill providing for a park of not less than fifty acres at Columbia, the State Capital, set with appropriate trees and with a memorial hall in the center. At Metuchen, New Jersey, the board of education planted a Douglas spruce in the school grounds to keep green the memory of that town's sons who served.

Mrs. William T. Igleheart reports from Evansville, Indiana, that they are planning to make the tree planting day there "a victory occasion."

And in Collamer, Indiana, the *whole* town helped in the planting of memorial trees. If the service had been held in a great cathedral or if there had been 100,000 people present, it could not have been more impressive and more patriotic in character than when the two hundred inhabitants of Collamer, Indiana, gathered to do honor to the eighteen sons of that town who were serving in the great war.

The tree planting, reported by M. L. Galbreath to AMERICAN FORESTRY, was in many ways unique and of permanent record. Collamer is in the home county of Vice-President Marshall.

Every person present took an active part in the ceremony. Everyone—young and old, after the tree had been set in place, took one of the spades and deposited some dirt around the roots. The spades which were borne by a Boy Scout and a Camp Fire girl were decorated with small American flags.

The first part of the services were held in the village school. There a report was made on each individual soldier from Collamer, as to the time he entered the service, his duties, location at that time and anything he might have said about the service and his home while away. This recital was made by some member of his family, father or mother, brother or sister, or by a friend. There was also a short dedicatory address by A. R. Fleck, county superintendent, explanatory remarks by Mrs. Oca Jellison, principal of the school whose husband was then in action in France, and prayer by Rev. Cyrus Fleck. Then the audience marched outside and formed a hollow square around the fence inside of which the tree had been placed and as each one passed inside he or she took one of the spades and placed a spadeful of dirt around the tree. Prayer and the singing of America closed the exercises.

Through memorial trees growing in their honor America's worthy sons will live again through the years to come.

THE MEMORIAL TREE PLANTING AT COLLAMER

The town of Collamer, Indiana, with 200 inhabitants planting a tree in honor of its eighteen sons who served in the war. Recital of the service of each man was made by some relative or friend. A Boy Scout and a Camp Fire Girl each had a spade with which each person present threw some dirt around the roots. The man inside the fence (side view) is A. R. Fleck, County Superintendent of Schools; the man next to the Boy Scout is Rev. Cyrus Fleck and woman at extreme left in front of the woman with baby in arms is Mrs. Oca Jellison, Principal of the school.

IN THE FURROWS OF FREEDOM

BY CHARLES LATHROP PACK

PRESIDENT, NATIONAL WAR GARDEN COMMISSION

A NATION is as strong as its homes. The purposes of the various community efforts, which today are occupying the thought of many leaders in civic betterment work, is to knit together and make more secure the home ties.

The greatest of all community efforts is that of home food production. The garden is the cement which helps to hold in place the foundation of the home. There is scarcely a city or a town in the United States where the question of bringing the producer and the consumer closer together has not been discussed and where some sort of plan has not been devised for bringing this about. But the method which has accomplished the most and which has proved most successful is that of the home and community garden. No other instruments have been found so helpful to the individual, the unit of community life.

"We Americans ought to be a nation of gardeners," says W. E. Babb, a Chicago newspaper man and apartment-house "cliff-dweller" who cultivated a garden last year for the first time in his life and found it not only profitable from an economic point of view but interesting and educational as well. "Nature intended that we should be a nation of gardeners," he adds, "and this applies to the man in the city as well as to the rural districts."

He tells how after clearing all the "weeds, tin cans and brick-bats from the vacant lot which he 'borrowed,' and digging up a carload of junk," he succeeded in raising "enough to supply a score of people with vegetables all summer, while in addition my wife canned a lot for winter use."

"And there was something more," he declares. "I learned that vegetables are interesting things to live with. I tried raising chickens once and got a lot of real pleasure out of it but it didn't compare with the joy and knowledge I got out of my war garden." He was awarded the first prize by the State Council of Defense for his war garden.

Many thousands of other people have learned that war gardening is not only valuable but interesting. City officials and business men have learned that it is a movement worth cultivating permanently. That is why, in addition to their knowledge of the present world need for food, they are backing the Victory Garden campaign this year. The community with the largest number of gardens in proportion to its population, other things being equal, is the most pros-

THE DAYLIGHT SAVING LAW

Here is the Daylight Saving Law which was in effect in 1918 and will remain in force during 1919, and which will settle the minds of doubters as to whether daylight saving is a one-year proposition or not:

"That at 2 o'clock ante-meridian of the last Sunday in March of each year the standard time of each zone shall be advanced one hour, and at 2 o'clock ante-meridian of the last Sunday in October each year the standard time of each zone shall, by the retarding one, be returned to the astronomical time of the degree of longitude governing each zone, respectively."

CABBAGES AND KINGS

When a factory worker has a garden like this with the best of vegetables right at the kitchen door he can feel as independent as an American citizen should feel. This is a corner in the one-acre garden of an employe of Eastman Kodak Company at Rochester, New York.

Photograph, Bureau of Agriculture, Philippine Islands
EGGPLANT AND LOMBOY

This is one corner of a vegetable garden at Singalong, Manila, where the home food production campaign has borne fruit.

community welfare schemes. This includes the planting of gardens. All these forces realize the binding strength of the home. Love of home reflects love of country and inspires the spirit that produces real patriotism. Lincoln said: "Let not him who is homeless pull down the house of another, but let him labor diligently to build one for himself."

America, the land of homes; America, the land of gardens! That is a "consummation devoutly to be wished," a goal worth striving for. The nearer we come to that aim, the richer in things spiritual as well as physical will be the nation.

Large industrial concerns which have encouraged and assisted their employes to plant gardens and to raise part of their own food testify to the value of the work as a stabilizer of labor and as making more contented and better workmen and citizens. The National War Garden Commission has received numerous reports which bear out this statement. Here, for instance, is what is said

WAR GARDEN WHERE FIRST ALFALFA IN UNITED STATES WAS GROWN

Lorenzo S. Clark, of Salt Lake City, answered the call of Pershing to "Keep the Food Coming" by planting a war garden on land where his father, in 1853, with seeds brought from England, planted the first alfalfa in this country. Under the direction of Walter J. Sloan, supervisor of city war gardens, Salt Lake City in 1918 planted more than 8,000 home food producing plots and raised $750,000 worth of its own food Mr. Sloan reports to the National War Garden Commission that they are planning for an even bigger campaign for Victory Gardens in 1919. He says: "There will be need for an additional food supply for years. The people of the United States, at least a majority of them, are just beginning to learn what it means to raise their own vegetables. I believe that it would be to their benefit, war or no war, if we could instill into the minds of the American people this thought—No unsightly back yards, no vacant lots. Weeds are a menace to health, so are empty cans and garbage in your back yard. We want health."

perous and the best community. One has only to look at value figures of what some of the cities raised last year, running into many thousands and in numerous cases into the hundreds of thousands of dollars, to realize what this movement means.

Closely connected with this home food production effort is the big "own-a-home" campaign which is being conducted this year throughout the nation. This is being stimulated by the United States Department of Labor, the National Federation of Construction Industries, real estate boards and chambers of commerce and various other organizations which have at heart the lasting betterment of the people. The Council of National Defense is now utilizing the vast machinery which it built up to help organize the nation for the pressing business of war, and turning it into the channels of peace and working out

A COMMUNITY GARDEN GROUP

Here are a few of the thousands of home food producers of Louisville, Kentucky, who have made a wonderful record.

of the movement by the Norton Company of Worcester, Massachusetts, whose employes last year cultivated 100 acres of company land on which they raised between $40,000 and $50,000 worth of food, in addition to that which more than 2,000 workers grew in their home gardens:

"The Norton Community Shop gardening activities are no longer an experiment. On the contrary they are an unqualified success, and the Norton Agricultural Society is looked upon by the company and its employes as a permanent institution. Many who have never handled the spading fork and the hoe are becoming enthusiastic amateur gardeners. Far from turning a good workman into a poor farmer, one of the most important results of the Norton garden activities has been the making of good workmen into better workmen. The procession of men who at the end of a summer afternoon in the shop tramp over the hill to enjoy an hour of vigorous exercise out of doors is matched the following morning by the returning ranks of clear-eyed, vigorous men ready to engage with equal enthusiasm in the regular vocational work which they have chosen. The harvest time, which brings to the man the tangible evidence of what intelligent effort, persistence and industry will produce in the garden, gives him a clear realization that the exercise of the same qualities in the shop is as certain to bring its reward. Better still, as the officers of the company and its men busy themselves in their gardens side by side, there arises the spirit of comradeship among all who embark together on some great adventure."

LOOK WHAT TRENTON DID

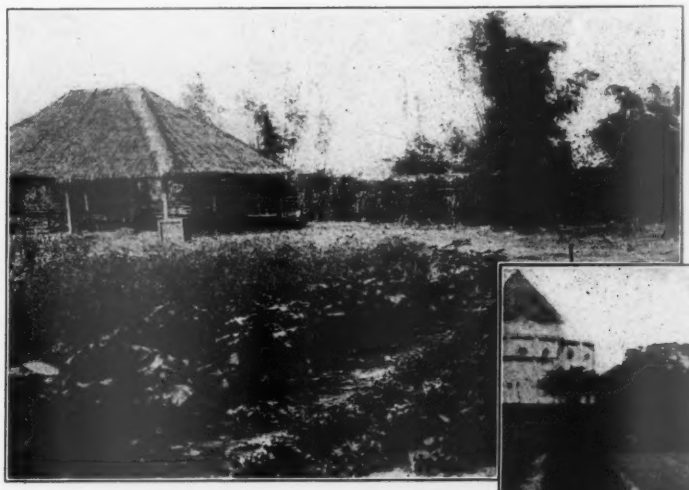
Some of the finest war gardens in the United States were in the capital of New Jersey, where the Trenton Food Garden Commission was active in keeping up interest in home food growing. Is this not a wonderful improvement on an ash-covered lot?

This idea is spreading around the world and other nations are coming to the United States to learn of the benefits which have come to this country as a result of the community and shop garden movement. The inhabitants of the Philippines have entered into this work with an enthusiastic determination to improve their own condition at the same time that they are performing a broad

GAVE UP GOLF FOR GARDENING

That is what W. E. Nemits, assistant general claims agent of the Chicago Surface Lines, did when he saw the need of raising food for the boys "over there." His report to the National War Garden Commission of Washington shows that although he had never done any gardening before he made a fine record. Individuals and communities everywhere are planning to make the Victory Garden Campaign this year a bigger success than was the war garden campaign last year.

humanitarian service. A report to the National War Garden Commission from the Secretary of Agriculture of the Philippines tells something of the way in which they are planting gardens there. This work has been well-organized and is being stimulated through district and municipal campaigns so that everybody is reached and encouraged to help in the food production effort. Demonstration gardens are being planted throughout the Island in the public squares and plazas of the different municipalities to serve as a standing call to the Filipino peoples to help in the world food war. The instance is cited of a fourth grade school boy in one of the islands in the Philippines who has taught a big lesson in food production to the natives of the whole island. He entered the contest which was held there and was given a small piece of land to cultivate. On it he raised a variety of vegetables. He was told, however, that it would not be possible for him to grow a second crop of corn, as it never had been done, and that the weather and other conditions would not permit. But he did grow a second crop of corn and it was larger than his first crop. In this way he converted the sceptics to the possibility and the value of rotation.



WHAT THEY'RE DOING IN THE PHILIPPINES

Lettuce and eggplant are some of the specialties they raise in their gardens at Singalong, Manila.

The Japanese Government is studying the methods which have been carried out successfully in this country by the National War Garden Commission. S. S. Honda, trade commissioner of Japan and an official in the Department of Agriculture, who was recently in the United States, took back with him to Japan all the information he could gather about home and community food production, with the purpose of organizing a similar campaign in his country. In discussing the subject he said that a survey of idle land was then being made and that his people, who knew virtually nothing about home gardening, would be urged to cultivate all the land available. Japan, of course, prides itself upon its gardens, he said, but it is because of the beautiful flowers and landscape effects for which they are famous not because of the vegetables which they grow.

The Victory Garden campaign in the United States this year is in full swing and, in the widespread interest shown and the number of gardens planted, bids fair to surpass the wonderful work done in 1918. Hundreds of organizations which were active in the movement last year are again in the field, while new ones are taking up the slogan of "Food F. O. B. the Kitchen Door," and urging everybody to get into the furrows of freedom to drive back the new enemy, General Hunger. Manufacturing concerns have prepared to assist their employes again this year by providing land for them to cultivate. There is increased interest among railroad employes in the work. State and city officials and garden committees are busy. Banks and libraries will assist again by the distribution to their patrons of thousands of garden books furnished them by the Commission. The newspapers of the country again are backing the movement and lending it their hearty support. Big campaigns are on in many cities and motion pictures are being used to show what the "city farmers" can do. As an illustration of what they are doing in some of the cities, here is what C. E. Smith, garden director of the Detroit Department of Parks and Boulevards, says in a letter to the Commission:

Photographs, Bureau of Agriculture, Philippine Islands

AT CALLE TAFT, MANILA

Everybody is a victory gardener in the Philippines and they are rounding up the "slacker land" even under the shadow of the cathedral dome.

"The work for the present year is well on its way and we are anticipating a much bigger and better work than the year previous. With a large number of gardeners already enrolled with us and the present amount of available land for garden purposes more than double that of last year, we feel assured that the victory gardening for this year will be well worth the most strenuous efforts." In Detroit they are using the Commission's posters on the street cars, particularly to call the attention of the factory workers to the need of home food produc-

tion. Advertising clubs are assisting and here is the text of a resolution adopted at a recent meeting of the Advertising Club of Washington:

KNOWING THAT the production of food is the paramount problem before the world today, and

KNOWING THAT the President of the United States has called upon us to help feed the people in the stricken areas of Europe, and

KNOWING THAT everything possible must be done to produce food as close to the place of consumption as possible; therefore, be it

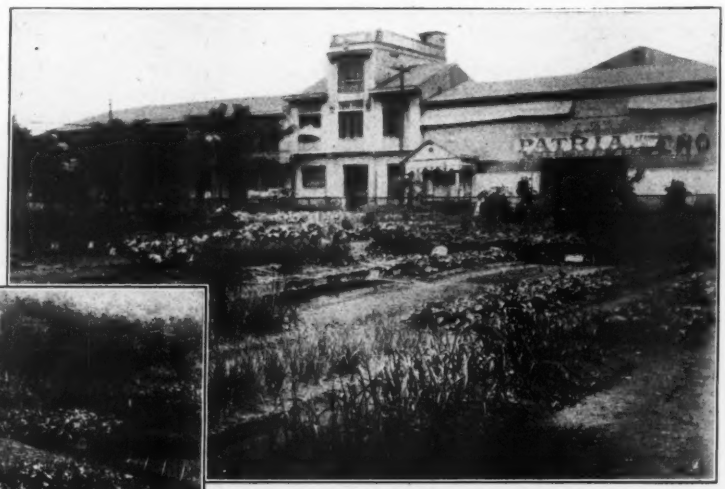
Resolved by the Advertising Club of Washington, That its members co-operate with the National War Garden Commission in its campaign for Victory Gardens by using window displays and garden copy wherever possible in order to carry the message of Food F. O. B. the Kitchen Door to the people, and be it further

Resolved, That we urge the Associated Advertising Clubs of the world to co-operate and that this resolution be sent to them.

The opening of the home garden drive this year and every succeeding year should be celebrated by a national holiday. It is a new independence day for the nation; and the home soldiers of the soil should have some-way of expressing the freedom which they have found in the garden. Of course, there is no fixed first planting day throughout the United States or even throughout a restricted territory; but some day might be fixed which would answer the purpose of calling attention in a nation-wide way to this great institution—the home and community garden. Pageants and parades can be arranged in the various cities.

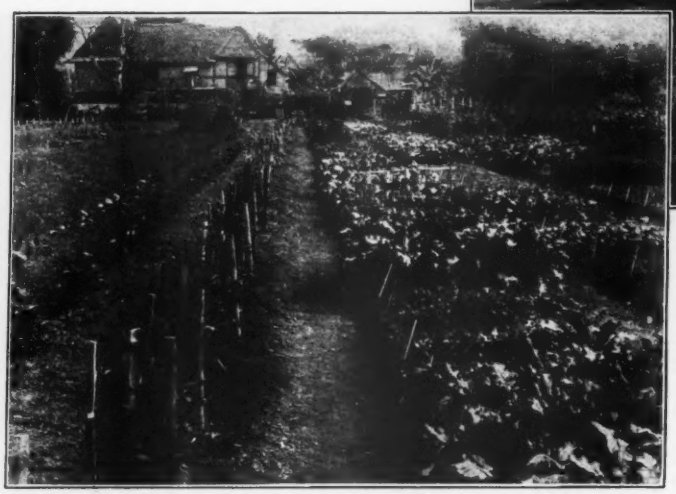
On the last Sunday in March the Daylight Saving Law goes into effect again, just in time to give the victory gardener the advantage of the extra hour of daylight every afternoon which meant so much to him last year and which meant the addition of millions of dollars to the nation's garden products.

Are you going to have a part in the harvest of victory? Will you help to conquer the new enemy, Hunger, which is killing thousands of people in lands across the seas? If you have not yet planted a Victory Garden, plan to do it today.



A CLEAN LOOKING PATCH

Pupils of the Tondo intermediate school at Manila are taught gardening, as is shown by this picture, and they are teaching their elders much about the work.



Photographs, Bureau of Agriculture, Philippine Islands

IN A PHILIPPINE GARDEN

The message of "Food F. O. B. the Kitchen Door" has spread to the lands beyond the sea; and the Filipino wards of Uncle Sam are doing fine work in home and community gardening.

PHILIP W. AYRES ELECTED PRESIDENT OF THE APPALACHIAN MOUNTAIN CLUB

FOR the first time in its history, the Appalachian Mountain Club has chosen a member of the forestry profession to lead it. At the recent meeting of the club, Philip W. Ayres, who has for years accomplished notable things for forestry in the State of New Hampshire, and who is the Forester of the Society for the Protection of New Hampshire Forests was elected President.

The members number over 2,000. There are well-developed chapters of the club in New York City and in Worcester, Massachusetts, while the general membership is more widely extended, including several members in Washington, District of Columbia. Its honorary and corresponding members include the distinguished mountaineers of Europe and America.

The club has eleven forest reservations in New Hampshire, varying in size from 1 to 300 acres, besides three reservations in Massachusetts and two in Maine. It maintains 54 paths in the White Mountains covering 213 miles. It maintains three huts of a capacity of 35 to 40 each in the highest parts of the White Mountains, besides nine other camps and various other shelters at high elevations above 3,000 feet and some of them above 4,000 feet, throughout the mountains. All of these are as freely open to the tramping public as to club members. The club is actively co-operating with the supervisor of the White Mountain National Forest in the matter of trails, telephone lines and fire lines.

THE USES OF WOOD

FENCING MATERIALS FROM FORESTS

BY HU MAXWELL

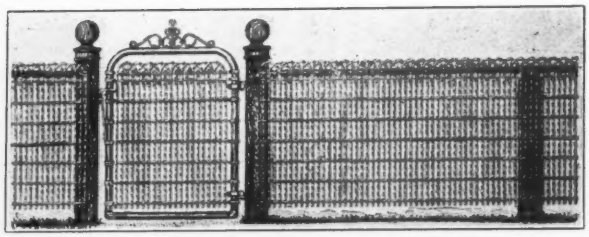
Editor's Note:—This is the eleventh story in a series of important and very valuable articles by Mr. Maxwell on wood and its uses. The series will thoroughly cover the various phases of the subject, from the beginnings in the forest through the processes of logging, lumbering, transportation and milling, considering in detail the whole field of the utilization and manufacture of wood.

THE forests have fenced American farms, orchards and yards. Much material other than wood is in use, and was used in the past, and doubtless will be in the future; but wood has held first place from the earliest times, and it is not inclined to yield that place now. It has been abundant and relatively cheap in many parts of the country, and in most ways has been satisfactory. The kinds of fences built of wood, or partly of wood, have been numerous and interesting, and fashion has been regulated largely by convenience. The first fence that encloses a newly-cleared field in a forested region may not be the same in style, appearance, and construction as that enclosing the meadow which occupies the same site a century later. The original fence may have consisted of brush, limbs, and poles procured from the land in the process of clearing. Such a fence was a continuous windrow of brush extending round the field. The building of one of that sort was like killing two birds with one stone; for the removal of the brush cleared the land, and when properly piled, the brush constituted the fence. Such a fence answered most purposes when freshly built, but it soon decayed, and then it settled so low that horses, cattle, and sheep could walk over it at will and thus enter and depart from enclosures. The brush fence never was much protection against hogs, for these animals were able to force passage through and under, and a short period of decay put such a structure out of commission. The brush fence used to be common and it has not yet become obsolete. It was never regarded as a wholly creditable farm improve-

Courtesy of "The White Pine Bureau"

WHITE PINE GATES OF QUALITY

An attractive gate gives class to premises and furnishes an introduction which never fails to impress favorably those who see it for the first time. Architects and landscape gardeners understand how to make the most of this asset. In this respect, wood seems more genuine than metal. This is the gate at famous "Beverly" on the Pocomoke River, Maryland.



RAILING AND POSTS OF WOOD

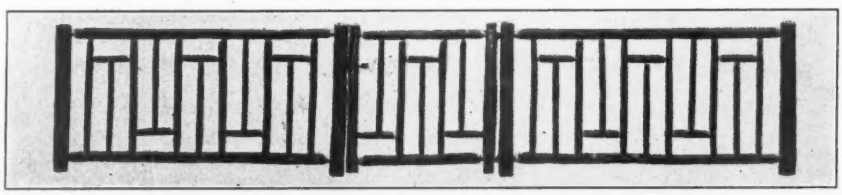
Fences of metal, in rods, bars, or wire, are frequently held up by posts and rails of wood. It is difficult to find a substitute for wood at reasonable cost. Wooden posts may be given preservative treatment to prolong their period of usefulness and to increase value. This is now done on a large scale.

ment, but rather as a makeshift for temporary service only.

The log fence, or that made of logs, poles, and brush in combination, was formerly more common than it is now. It differed only slightly from the common brush fence. It might last a year or two longer if the destroying agent was decay alone. It was often easier to roll logs, trunks, and branches together and build a fence of them to enclose a field than to bring them together in heaps and rid the ground of their presence by burning. A week of constant attention might be necessary to rid the ground of a group of log heaps by burning, but when rolled to the margin to form a fence, the logs were out of the way. Some fences were built of stumps pulled from the ground and their roots all turned in one direction. Such were more common in northern pine regions than elsewhere, because pine stumps are easily pulled from the ground and they retain their roots many years. A structure like that is sometimes known as a Canada fence because common in the pine regions of Canada.

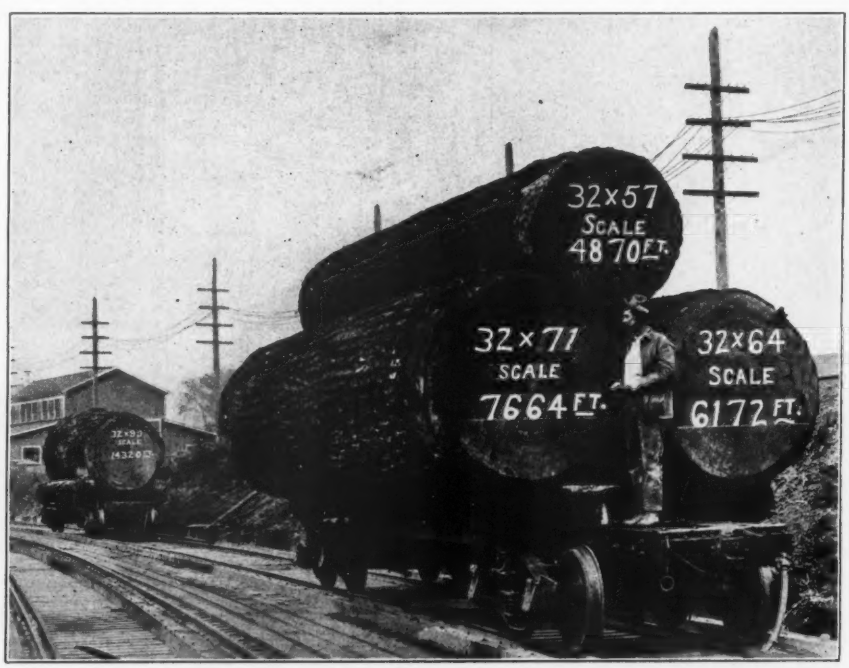
The fence rail was the ever-present and all-important unit of fencing material. It still occupies a conspicuous place, but has lost some of its popularity. The rail is split from timber, and the regulation length is eleven feet, but variations in length are many. Rail-splitting was a common occupation in early times. Farmers mauled the rails with which they enclosed their fields. The splitting was done with mauls, iron wedges, and wooden gluts; and a strong, industrious man, when he had good timber already cut into suitable lengths, could split 400 or 500 rails a day. Champions had records as high as 1,000 rails a day; but such a number was impossible except under the most favorable circumstances. The rail fence is usually constructed with zig-zag panels, the pattern being known as a "worm" fence or "Virginia" fence, the first name being due to the resemblance of the line to the path of a crawling worm.

Rails have varied much in size, according to timber and region. During the Civil War, lines of walnut fence in Indiana were purchased by gunstock manufacturers, and it is said that those rails averaged the equivalent of fifteen board feet per rail. A mile of that fence represented enough timber to saw 75,000 feet of boards. The staked and ridered fence required a little more. Enormous quantities of timber have been mauled into rails in some of the forested regions, where wood was cheap, fields small and farms numerous. The West Virginia Conservation Commission estimated that, from the earliest settlement



ORNAMENTAL RATHER THAN USEFUL

Rustic fences are built in many styles, but most of them are intended to be ornamental. In most instances other kinds of fence could be built for less money, but cheapness is not the main purpose held in view by builders of fences of this kind. The rustic fence is often ready made in factories.



IS THIS TOO GOOD FOR FENCES?

They figure that enough wood is in these two cars of logs to make two-thirds of a mile of plank fence, but that the lumber will be of a grade too good for fencing. That is a matter on which opinions may differ. The best white pine of New England was not considered too good for fencing. These logs are Douglas fir.

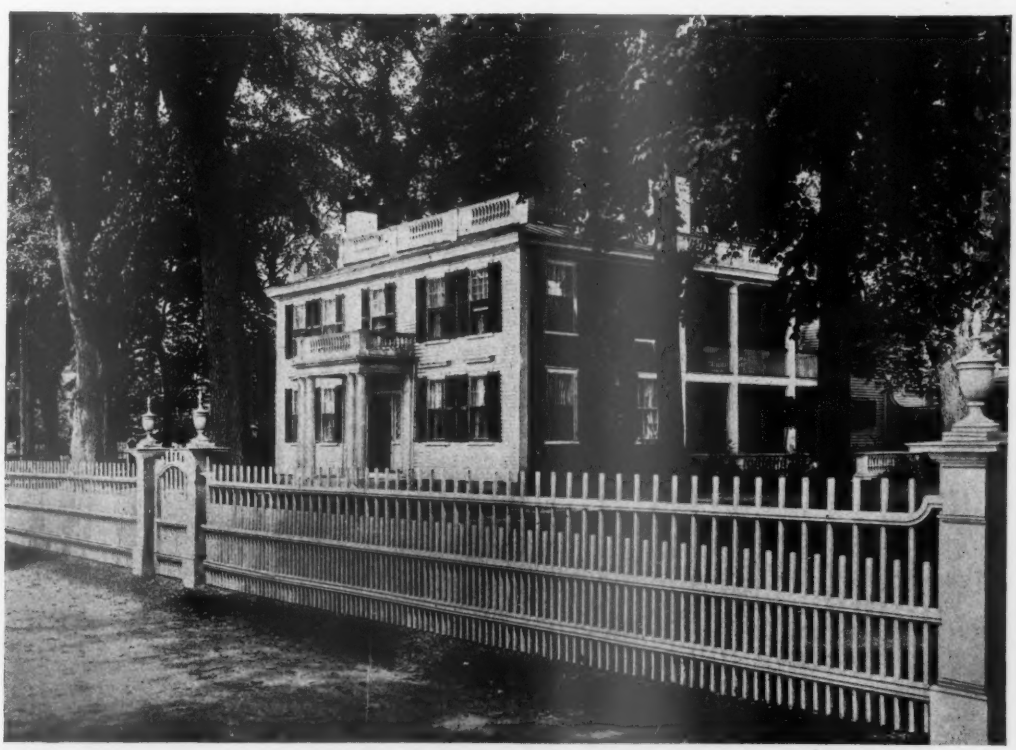
of that State down to the year 1900, no less than 4,500,000,000 feet of timber had been split into fence rails. Most of it was oak and chestnut, but some was yellow poplar, black walnut, white pine, white ash, and slippery elm. Worm fences are still being built, but they are disappearing in favor of wire and boards, or of straight fences constructed of rails and posts. The post-and-rail fence has been considered as the connecting link between the pioneer worm fence and the plank fence. It was once made of flat rails whose ends were fitted in holes mortised in posts set ten feet apart. Such fences ran in straight lines. It was a little cheaper than the worm fence if timber had any value. It required about 55,000 feet of timber to make a mile. The plank fence uses sawed lumber instead of flat rails, and nails are the fastenings instead of mortises and tenons as in the post-and-rail pattern. A plank fence may be built with from 30,000 to 40,000 feet of lumber per mile, including the posts. There is another pattern of rail fence much used on very steep

WORM FENCES ENCLOSING MOUNTAIN FIELDS

A few long lines of fence like this may still be seen in mountainous regions where timber has only recently become salable, and was formerly mauled into rails. Replacements are now made with posts and planks or posts and wire. This fence is in Tucker County, West Virginia.

HOW A "SWEDE FENCE" BRISTLES

Such fences are constructed up and down steep hills where the ordinary worm fence will not stick to the ground. This one defies the worst farm rogues, having been modeled after an old military device constructed to stop cavalry. This fence is on a farm among the Allegheny mountains.



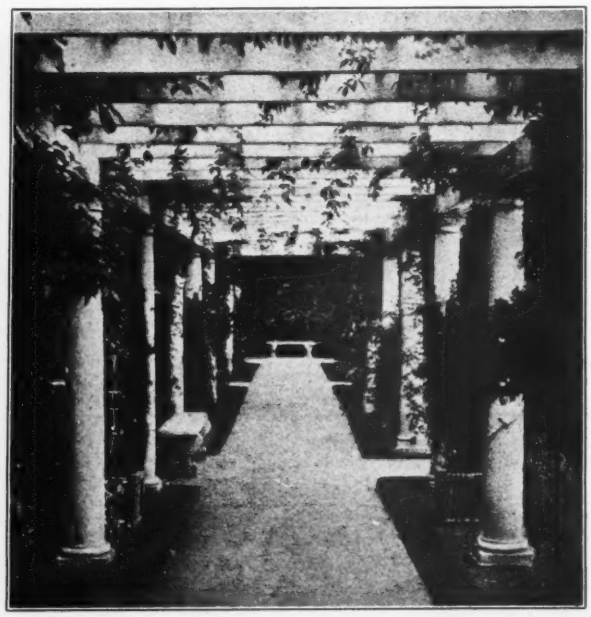
Courtesy of "The White Pine Bureau"

FINE AND FAULTLESS AFTER A CENTURY

The white pine palings enclosing the famous Spaulding House at Nashua, New Hampshire, show few signs of deterioration after a long period of exposure to the weather. The fence has received care and has been kept well painted. Neglect is the greatest enemy of out-of-door woodwork.

ground where the common worm fence will not stand. It is known as a "swede" fence, so named from its resemblance to an old military contrivance built of spikes called "swedish feathers," and intended to check attacks of cavalry. In building the swede fence one end of the rail rests on the ground while the other end is elevated at an angle of thirty or forty degrees and is supported on stakes which cross each other like the letter X.

Various patterns of paling and picket fences are in use, in some of which the pickets are held by nails, in



Photograph by Courtesy of the Hartmann-Sanders Company

THE PERGOLA'S FINISHING TOUCHES

Happy surroundings tend to convert idle moments into years of pleasant memories and the pergola has helped transform many barren spaces into spots of charm and beauty.

others they are woven with wire; and in a few of the old cypress picket fences of the South, wooden pegs were used in place of nails. In some instances it has been found that the peg was the better fastener, for it remained sound after nails of the same age had been destroyed by rust. The picket fence involves a catch problem in geometry which some of the old-time pedagogues thought quite interesting, and they liked to put it up to their advanced pupils thus: "Prove that more pickets are required for a mile of fence on level ground than for a mile up and down hills." The pupil who could prove the positive side of the proposition and round out his reasoning with the formal and classic *quad erat demonstrandum,* always received one hundred per cent in his grade in mathematics.

Every species of wood in the United States which attains sufficient size, has done service as fence rails, either after being split or in the form of round poles; but not one species in twenty is satisfactory for split rails, crude and common as such rails are. A wood has generally been considered defective as a fence rail prospect unless it could be split easily and was resistant to decay. Relatively few woods possess both of these qualities in the desired degree.

It is not practicable to make a list of rail timbers to include all the good and exclude all the bad. It depends largely upon the region. Where white oak and chestnut were plentiful, rail splitters used few others in former times; but some regions had neither of these. Black walnut was more durable than oak or chestnut, but its range was limited to certain districts, and chiefly to rich land; consequently, only here and there were walnut fences possible. Yellow poplar splits well, but it is brittle, breaks easily, and is prone to decay when exposed to the weather, and its use as rails was restricted by a prejudice against it even in regions where trees were plentiful and of splendid size. Many pine rails were made formerly, and a few are still made, but unless the sapwood is excluded, the pine rail rots quickly. White ash splits in a beautiful manner, and before the wood became valuable in a commercial way, much splendid ash timber was mauled into rails. All cedar with highly colored heartwood makes good fence rails; but only a few cedars are large enough for splitting, after the sapwood has been excluded; and some cedar splits none too well. Millions of rails were made of southern red cedar, and trainloads of such rails were brought up many years

CATALPA FOR FENCE POSTS

This cut shows a small catalpa tree just attaining size fitting it for fence posts. It is one of the handsomest trees of our forests and its large leaves and showy flowers cause it to be planted oftener for ornament than for posts. However, it serves both purposes well, and is widely used.

later to be made into lead pencils. On the northern Pacific coast the giant red cedar contributed rails for many a mile of fence. In California a similar service was exacted of the incense cedar; but the rail fence was never as popular in the far west as it was in the eastern country in early times. The westerners preferred to use

OSAGE ORANGE FENCE POSTS IN KANSAS

These posts were cut from planted timber, for Osage orange is not a native tree in Kansas. It once formed hundreds of miles of hedge fence in the treeless states, and now some of these hedges are being cut for fence posts, having reached that size because they were not kept cut back.

the incense cedar for posts and finish the fence with lumber cut from yellow and sugar pines or from redwood. Southern cypress possesses the essential qualities required of good rail timber, and much of it was once put to that use.

Nearly any wood may occasionally be made into rails, either because it is convenient, or because no better is in reach. One rather abundant tree is never worked into rails, because it is unwedgeable. It is black gum which

RAMSHACKLE RAIL FENCES

Unless rail fences are kept in repair, they are not things of beauty and may soon cease to be things of utility. There are reasons to feel thankful that old style rail fences are passing out of use. They are wasteful of both wood and ground. This is a scene in southern Indiana.

cannot be split unless solidly frozen. Old rail splitters always liked to initiate a novice by assigning him a black gum log to split, and then joshing him on the subject of his speed.

The best trees were always selected by rail makers (speaking in the past tense) because such were more easily split than those that were crooked and knotty. The result was, in pioneer times, that the very finest oak, chestnut, ash, and walnut were cut for rail fence material.

Enormous numbers of fence posts are now in use and have long been in demand. The chief quality of posts must be durability. They are always in contact with the ground, and at the point of contact decay is active. For that reason it is necessary to select the more durable woods for posts if long service is wanted. Probably half

UNUSUAL BUT EXCELLENT FENCE MATERIAL

These uncouth specimens, which might be mistaken for vegetable porcupines, are tree yuccas growing on the Lincoln National Forest, in New Mexico. Stockmen use the dead and dry trunks in making corral fences. The logs are set on end in the ground, forming palisades which answer the purpose well in regions where other timber is scarce. Photograph by the United States Forest Service.

of the fence posts in use are neither sawed nor split. They are round poles, sometimes with the bark still on, but commonly peeled. It is not so essential with posts as with rails that the wood split readily, though trees more than six or eight inches in diameter are generally sawed or split before being set as posts.

Trees of every species, if large enough, may be used for posts; but some of them decay so quickly that they are scarcely worth the trouble of setting. A post that does not last five or six years is unprofitable. A split or sawed post usually lasts longer than one of the same wood in the round, because the round post is apt to con-

tain a higher proportion of sapwood than the sawed post, and the larger the proportion of heartwood the longer the post will likely last. Every forested region has certain woods more durable than others, and these are preferred for fence posts. The following woods are regarded as good post material in regions where they can be had:

Yellow or black locust occurs in the middle Appalachian region. This tree's range has been widely extended by planting.

Incense cedar and redwood abound in California and in southern Oregon. The posts are always sawed or split from large trees and the sapwood is rejected.

Osage orange or bois d'arc grows in Texas and Oklahoma. The sap is very thin, round posts are not objectionable, and those sawed or split are not often seen.

Chestnut ranges from Connecticut to Georgia, and the posts are sawed, split, or round.

White oaks of more than a dozen species are made into posts in practically all parts of the United States. The posts are nearly always sawed or split.

Black walnut heartwood is very durable, but the sapwood is nearly worthless for posts. Black walnut was never largely used for posts.

VIRGINIA RED CEDAR

This tree is known as the Virginia red cedar, but at the present time more of it is cut for posts in Texas than in Virginia. It grows in all southern states, and in Tennessee much of it was formerly split for fence rails, but it is no longer used in that way. Few woods resist decay better than this cedar.

Mulberry heartwood is durable and posts from large trunks last well, but the trees are not abundant.

Mesquite and several other leguminous species of the Southwest have thin sapwood, very durable heart, and make good posts, though the boles and branches are usually very crooked.

Southern red and white cedars, and northern white cedar or arborvitae, are extensively used for posts and are shipped far from the region where they grow.

IDEAL TREE FOR RAIL SPLITTERS

Millions of fence rails have been mauled from such oaks as this. The pioneer fence builder picked the largest, finest trees because of the ease with which they could be split and of the symmetrical rails produced. Heartwood was wanted, and large trunks contained relatively more of it than small.

Catalpa lasts well, and since most catalpa posts are cut from planted trees, the range of this wood covers most states in the Mississippi Valley, and also in other regions. The principal original range of catalpa was restricted to the lower Ohio Valley.

The question as to what wood is most durable as fence posts has not been decided. Both the wood and the situation must be taken into consideration. Locust and Osage orange are rivals for first place, if situations are the same; while in the dry climate of California, incense cedar and redwood last a long time. In the southern country they have called cypress the "wood eternal," under the assumption that decay has little effect upon it. It lasts a long time, but not forever.

The practice of treating fence posts with preservatives to hinder decay has become extensive and is on the in-

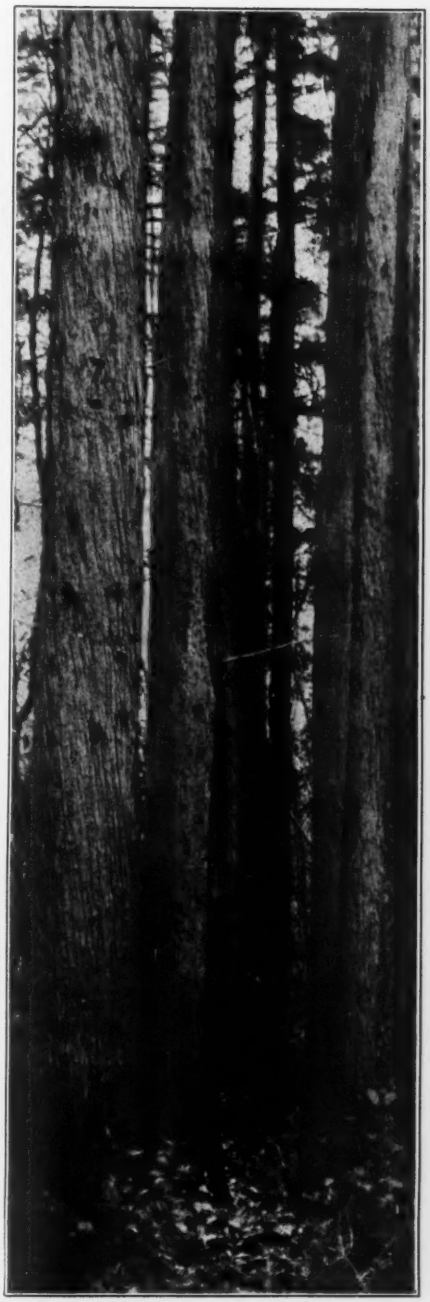
crease. By such treatment, some woods which are not naturally durable may be converted into long-lasting posts.

It has been said that America has used more wood for fences than for houses, and the statement is probably true. Wooden fences are peculiarly liable to destruction by decay, fire and flood; and they must be repaired or renewed often. They can have little protection against weather. Paint is occasionally applied, but not often. They are in contact with grass, weeds, and leaves, all of which promote decay. Fires were more destructive in the past than at present, but even yet much fencing is consumed in grass and forest fires.

No one can name a maximum, minimum, or average period of service for a wooden fence. So many influences and accidents must be taken into account that one case is not like any other. A fence of round buckeye poles among the Allegheny mountains has been known to rot down in a single year; and a similar fence of red alder on the Pacific coast may be useless through decay in a time equally short. On some of the high and dry ridges of western Maryland and the adjoining parts of Pennsylvania, farmers point with pride to worm fences of chestnut rails and claim that their grandfathers built them nearly a century ago. Old-fashioned doctors of that region formerly made a rheumatism remedy which is not listed in the dispensatories. It was distilled from the moss-covered chestnut rails, the oldest and dryest that could be found. The wood was hogged with an ax, placed beneath a bottom-up kettle that had a fire built on top, and in that manner the oil was roasted out of the chestnut wood. "A teacup of chestnut rail oil, well rubbed in" was declared to be a cure for any case of rheumatism that was curable. The only interesting point in the prescription is that the fence rail must be a hundred years old. Some of the cypress paling fences in the southern states, and the white pine palings in the North, are reputed to be a hundred years old. Ordinarily a chestnut or oak rail fence needs a good deal of repairing at the end of fifteen or twenty years, and in less time if the fence is permitted to be overgrown with brush, as the custom is with untidy farmers.

PRIME NORTHERN WHITE PINE

Thousands of miles of plank fence in the northern states from Maine to Minnesota have been built of white pine boards cut from trees as faultless as that in the accompanying illustration; but at the present time timber of that class is seldom used for fencing boards because it is more valuable for other purposes.



SOUTHERN WHITE CEDAR

All cedar is classed as good fence post material because of its durability when in contact with the ground. The cedar shown in the cut ranges from New Jersey to Florida, near the coast, often in very wet situations such as the Dismal Swamp in Virginia. Enormous quantities of posts of this wood are used yearly.

Fences have never been the product of factories, except to a very limited extent. It has always been the custom to procure the raw material, haul it to the desired place, and build the fence in situ. That has held true whether it was a rail fence, or one of planks and posts, pickets, or posts and wire. Occasionally, the raw material grows on the ground to be enclosed by the fence. That was usually the case in pioneer days when the clearing of the land was the heavy job and the building of the fence a side issue. In more recent times fences have usually

been made of materials brought wholly from a distance.

Gates and some kinds of fencing are now the product of factories. Such factories are often located near large mills or in lumber centers. Several articles are included in the output, among them being gates, ready to hang in place; pickets ready for nailing up, or already made into panels suitable for fastening in place; woven fencing consisting of slats attached to strands of wire. The gates are of various patterns, fitted for different service. Some are small and intended for dooryards, others are farm gates for fields. The slat-and-wire fence is sold in large rolls or spools for convenience in hauling and handling.

The industry which turns out fencing and gates as here described, is small in comparison with some of the other wood-using industries, yet the annual total of wood

TYPICAL OLD STYLE RAIL FENCE

This "worm fence" is an old timer. It is a survival from past generations, and except in a few regions only a few of them are left. The fence here shown has probably stood more than fifty years. When it finally disappears, it will be replaced with a fence of posts and wire or posts and boards.

consumed in the United States exceeds 23,000,000 feet. The principal gate and fence woods, and the yearly demand for each are here given:

	FEET
Yellow pine	6,765,000
Hemlock	5,152,000
Chestnut	5,121,000
White pine	3,883,000
Oak	2,640,000
Spruce	1,070,000
Douglas fir	805,000
Cypress	681,040
Cedar	465,500
Birch	300,000
Elm	155,000
Maple	140,000
Redwood	133,000
Basswood	50,000
Larch	48,000
Western Yellow Pine	33,000
Yellow poplar	5,000
Hickory	600
Total	27,448,840

The manufacturing of this material is not evenly distributed over the country. Thirty-four states produce none. Most of the manufacturing is confined to states listed below, with the yearly output of fencing and gates:

	FEET
Virginia	6,925,000
Minnesota	4,570,000
Iowa	950,000
New York	725,000
Washington	320,000
Indiana	176,000
Pennsylvania	161,000

More disputes, controversies, and quarrels have been caused by fences and lack of fences than by any other one cause during the whole journey of man from savagery up to the present hour. Even Homer, ancient as he was, based poetic similes and other figures of rhetoric, upon farmers scrapping over their line fences. Early laws in all countries were passed for the purpose of regulating boundaries, landmarks, and fences. Every state in this country has its laws on the subject. One of the first matters which statutes seek to settle is the definition of a "lawful fence"—how high it must be, and of what materials and construction. If roguish cattle break through or jump over a lawful fence, the owner of the stock is liable for damages. If land is not enclosed with a lawful fence, the owner of the land may be stopped from collecting damage for trespass. However the same laws do not hold everywhere. In some states "every man's line is his fence," and he need not build any fence except for his own convenience, and he can claim damages for trespass. Some laws fix the height of a lawful fence and specify the material of which it shall be built. There is wisdom in the old adage: "Good fences make good neighbors," the meaning being that community quarrels are reduced to a minimum if all the fences are in first-class order.

PROSPECTIVE POST TIMBER RUINED

Here is a young locust tree being devoured by borers. That fate is overtaking millions of locust trees in the United States. Large and small alike fall victims to these insects. No protection against the attacks is known, and when an attack is once made on a tree it is done for, though it may fight many years against its fate.

THE WATERFOWL

(Family Anatidae)

BY A. A. ALLEN, PH.D.

ASSISTANT PROFESSOR OF ORNITHOLOGY, CORNELL UNIVERSITY

TO ONE who is fond of nature in her wilder moods, there is nothing more fascinating than the flight of the waterfowl. Seen against a leaden sky or against the first flush of dawn, the sweep of their rapidly moving forms holds a charm that can be replaced by nothing else. The eye follows until as merest specks, they disappear into the haze, leaving one with a feeling that nature is not yet vanquished, that there are still great spaces unexplored, that man, after all, is but one small part of the great creation.

A MALLARD DUCK IN ITS NEST IN CAPTIVITY

Compare this bird with the drake mallard in breeding plumage and in "eclipse."

Vast stretches of brown marsh, or waves lapping on the lake shore, or surf pounding on the headlands are the setting for a picture that clings to one's memory: there are decoys tossing on the waves, mere blocks of wood carved and painted to resemble ducks; crystals of snow driven before the blast cut and sting the face; frozen spray covers the blind and the hunters that lie in wait; Aeolus plays a tune in the gun barrels. The uninitiated wonder how men can endure such privations in the name of sport but they have not seen the picture, nor heard the music of the wind, and the waves, and the whistling wings. For nature has ordained that man shall not lose his primitive hunting instinct nor his love of primeval conditions that bring him close to her bosom. No matter how civilized the world may become nor how crowded her thoroughfares, the freezing winds, and the waves, and the ice and the snow that bring an imprecation from many, will still find a joyful response in the men who go down after ducks.

Let us, therefore, wisely conserve what we have, and as the number of hunters increases, let the open season be shortened and the bag limit lowered. Let us propagate waterfowl in captivity with which to restock the marshes so that our children's children may still view the picture that made its appeal to our forefathers and to us.

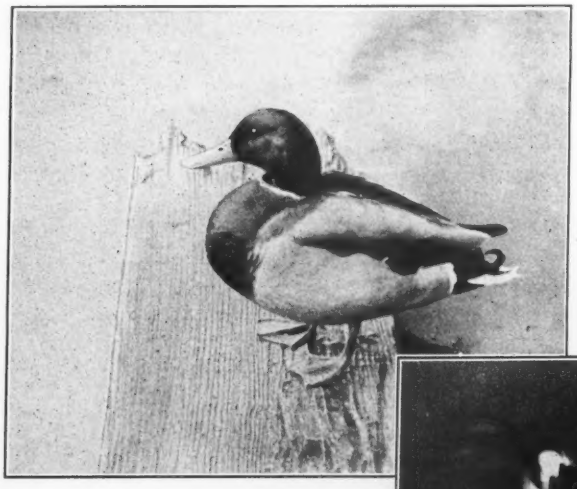
There are over 200 species of waterfowl of which about fifty are found in North America. They are grouped into five sub-families or groups that are rather easily distinguished: the swans, the geese, the mergansers, the dabbling ducks, and the diving ducks. The swans have much longer necks than the other waterfowl, even longer than their bodies. The geese have shorter necks than the swans but longer than the ducks. The mergansers differ from all the others in having narrow, serrate bills. The dabbling and diving ducks are readily distinguished from the swans, geese and mergansers but are not so easily separated from one another, unless one can observe their method of feeding or distinguish the lobe on the hind toe which characterizes the diving ducks. The dabbling ducks frequent the marshes and lake shores where they can feed in shallow water by tipping. They feed mostly at night or on dark days and spend the bright days at a safe distance from land. They usually occur in small flocks, those of over a hundred

A CANADA GOOSE

Geese have longer necks than the ducks but shorter necks than the swans. This is the commonest species.

being rare and those of from five to twenty much more numerous. They migrate earlier than the diving ducks, most of them having left the Northern States by the time the ponds and marshes have frozen. They winter from North Carolina to the Gulf and some species go as far as northern South America. The dabbling ducks are likewise called river ducks and summer ducks.

The diving ducks, sea ducks or winter ducks, on the other hand, often occur in flocks of several thousand and



THE PROGENITOR OF OUR DOMESTIC DUCKS—A WILD MALLARD DRAKE IN BREEDING PLUMAGE

All the breeds of domestic ducks except the muscovy are thought to be descended from this bird. (The photographs of ducks on the plank are of wild birds in captivity.)

A CANADA GOOSE FEEDING IN SHALLOW WATER

feed in deep water, often far from land, for they dive readily and secure their food of molluscs, or the roots and buds of aquatic plants in water up to 100 or 150 feet deep. They are not influenced by the freezing of the marshes and shallow water, therefore, and migrate later in the fall and winter further north than the others. They are less exposed than the dabbling ducks to enemies while feeding and, therefore, feed more during the day than at night. They are better adapted for diving than the dabblers, having larger feet, stockier bodies, shorter necks and shorter wings, characteristics which enable one, when familiar with them, to distinguish the two groups of ducks on the wing at a considerable distance. On the water, the diving ducks rest lower and do not hold their tails so high from the water as do the dabblers.

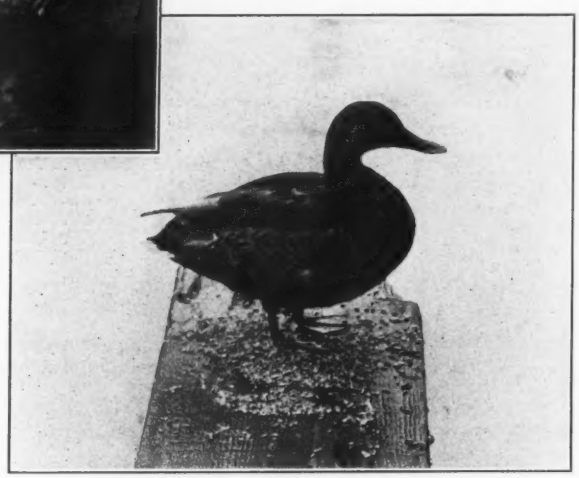
THE SWANS

Of the eight species of swans, there are two found in North America. Both species are pure white, except for the black bill and feet and a yellow spot between the eye and bill that distinguishes the whistling swan from the trumpeter. Both resemble very closely the domesticated swan of ornamental ponds which has been derived from the European mute swan and which can always be identified by the hump or knob on its bill. The trumpeter swan is today one of the rarest of North American birds if, indeed, it is not extinct in the wild state. A few individuals are still living in captivity. The whistling swan still holds its own in a few places, now that it is protected by law, and every winter large flocks congregate on Currituck Sound and a few other good feeding areas. In summer the whistling swan retires to the barren grounds to breed where it is said to be very conspicuous on its nest but it is able to defend itself against all enemies up to the size of a fox.

Swans are noisy birds and when feeding or disporting themselves, their loud clarion-like notes can sometimes be heard for several miles. They can swim very rapidly and outdistance a man rowing a boat so that they do not take wing unless hard pressed. On the wing swans are easily distinguished by their large size, long necks and pure white plumage, not even the flight feathers being dark.

THE GEESE

Of the twenty-five species of geese in the world, eight are found in North America, of which the Canada goose is the most abundant and best known. Canada geese nest from northern United States northward to the limit of trees and winter from the Great Lakes southward to the Gulf. Their comings and goings are the most conspicuous bird migrations that we have. We hear their loud honking long before we see them as they travel high over head in a great wedge or Y led probably by an old gander. They migrate both by day and by night and sometimes on foggy nights apparently get lost and are attracted by the city lights and swing low over the house tops honking loud enough to waken even the most torpid.



THE MALLARD DRAKE IN "ECLIPSE PLUMAGE"

The plumage is worn during July and August while the flight feathers are being replaced. It corresponds to the winter plumage of other birds.

On their migrations they are great vegetarians and are fond of grazing on the young wheat both in the spring and in the fall. In the south on their wintering grounds,

however, they seem to prefer to feed in the shallow water of the bays and lagoons, tipping for aquatic plants and animals.

Geese are said to mate for life and, certainly in captivity, it is difficult to get old birds that have lost their mates to make another choice. The male goose is a dutiful husband and assists his spouse in hatching the eggs and caring for the young. Both sexes are able to deliver severe blows with their wings which are armed with bony knobs at the first joint and they are, therefore, far from helpless even when they have shed all of their wing feathers and are unable to fly.

FEMALE PINTAIL

The female does not change her color during the molt. Here she has lost her flight feathers.

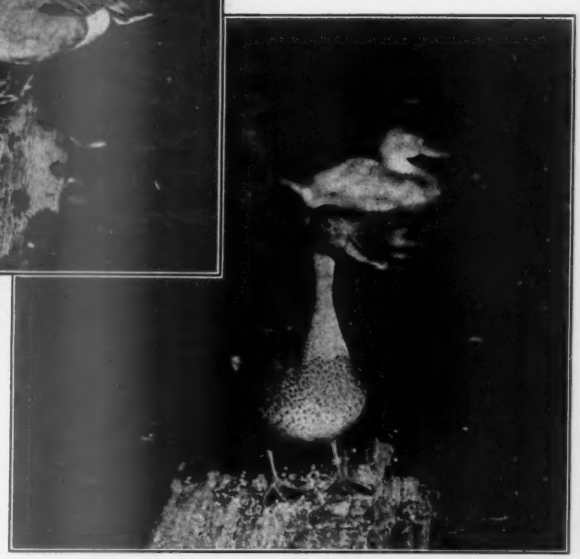
MALE PINTAIL IN BREEDING PLUMAGE

The long neck of the dabbling ducks is greatly accentuated in the pintail.

The Canada goose differs from the other species in having broad triangular patches of white on the cheeks which meet on the throat. The Hutchins, white-cheeked, and cackling geese are western representatives of the Canada goose. The two species of brant are similar to the Canada geese in having the head and neck black and the body grayish brown but the white is confined to a few white streaks forming a collar on the neck. They are considerably smaller and are confined largely to the sea coast, the black brant to the Pacific coast and the common brant to the Atlantic. The snow geese are easily recognized because they are pure white except for their black flight feathers and a grayish patch in the wing. The eastern greater snow goose is larger than the western lesser snow goose. A still smaller and rarer species, the Ross snow goose, is likewise found in parts of the West. In Alaska there is another species, the Emperor goose, which rarely comes south into the United States. It has a white head and tail and a bluish gray body more or less specked with white. The chin and throat are dark, a constant difference from the rare blue goose which otherwise is a similar looking bird of eastern North America. The breeding range of the blue goose in northern Canada is unknown, but it winters in Louisiana. The white-fronted goose is very similar to the European Gray-lag goose, and therefore to our domestic geese which have been derived from it, with the exception that the region around the base of the bill is white in the native species.

THE MERGANSERS

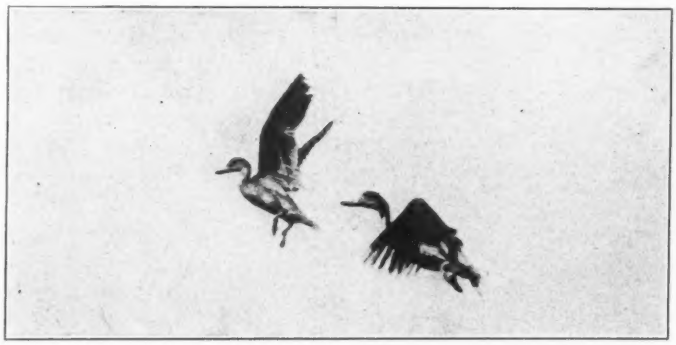
The mergansers, sheldrakes, saw-bills, or fish ducks as they are variously known, form a very distinct group of waterfowl, easily distinguished by their narrow serrate bills and their crested heads. Three of the nine species are found in North America but because of their fishy diet, they are nowhere valued as food. Individuals of the two smaller species, the hooded and red-breasted mergansers, however, are often eaten and pronounced as good as many of the true ducks. The females of all three species are grayish birds with conspicuously crested, reddish-brown heads, the crest of the small hooded merganser being the largest. The males are conspicuously marked black and white birds, the male hooded being one of the most ornate of the waterfowl. Mergansers secure their food by diving and pursuing their prey beneath the water using only



MALE PINTAIL IN "ECLIPSE" PLUMAGE

This plumage is worn only while the flight feathers are being replaced instead of all winter as with most birds.

their feet for propulsion. They first locate their prey by lowering their heads as they swim until their eyes are beneath the surface film and their serrate bills, with the hook-like nail at the tip, are well adapted for holding the slippery fish. Very often the gulls hover over the spot where the mergansers are fishing and swoop down on them when they come up with a fish. Before the poor birds can get a chance to juggle the fish about and swallow it, they are sometimes so annoyed by the gulls that they drop it and then the gulls promptly fall upon it and begin quarreling among themselves. Mergansers nest either in holes in trees or in crevices in the rocks and, like the other ducks, lay whitish, unspotted eggs.



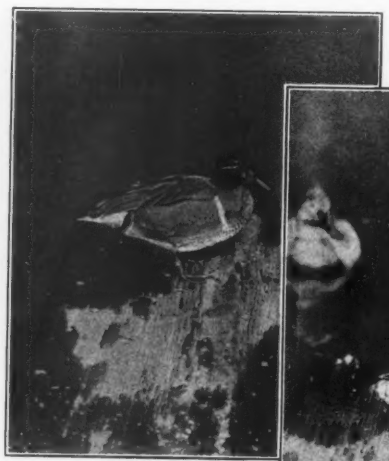
FEMALE PINTAILS GETTING AWAY

Typical Dabbling ducks with longer necks, longer wings and more slender bodies than the divers. Compare with the scaup ducks.

THE DABBLING DUCKS

All of the domestic ducks and most of the ducks that are commonly known, belong to this group. Indeed all of the breeds of domestic ducks from the white Pekins to the Indian runners, with the exception of the muscovy, are thought to be descended from one species, the mallard or common wild duck, which is a typical member of this group. The muscovy is a very distinct species native to the West Indies and northern South America. The wild mallard differs but little in coloration from the domestic breed, the males having bright green heads and white rings around their necks and the females being uniformly streaked yellowish or grayish brown. Under domestication, however, the birds change considerably, becoming much heavier, with fatter heads and sagging bodies. In the wild state the mallard is found all over the Northern Hemisphere, though in North America, it is more abundant in the West and in the Mississippi Valley than in the East. Here its place is filled by the black duck or black mallard, as it is sometimes called, a warier species that is better able to take care of itself in more closely settled districts. Male and female black ducks are alike except for their bills which in the males are yellow and in the females olive. They are uniformly brownish black except for the purple patches and the snowy white lining of the wings. Both the black and mallard ducks feed to a considerable extent in the grain fields in the northern states, spending the day out at sea or on the larger bodies of water and feeding only at night. They are likewise residents of the marshes and it is here that they are most successfully hunted.

Space permits only a mention of the remaining dabbling ducks of which there are nine other species found in North America. The best known of these are the pintail, the baldpate, the shoveller, the gadwall, the blue-winged and green-winged Teals, and the wood duck, the last being the most brilliantly colored of all. Its crested purplish green head, variously marked with white, its purplish chestnut breast and its buffy flanks all tend to make it a striking bird much desired on ornamental ponds. The males of the other species are quite beautifully marked in their breeding plumages with whites, browns, blues, and metallic colors but the females are uniformly plain. The fall plumage of the male birds which is donned in late summer and worn for only a short time while the flight feathers are being replaced, resembles that of the females which is the same throughout the year. This early fall plumage of the males, which is never worn all winter as with most birds, is called the "eclipse" plumage. It serves to make the birds less conspicuous while they are replacing their flight feathers and are therefore comparatively helpless, for unlike most birds the ducks shed all these feathers simultaneously and are without the power of flight for four or five weeks until the new ones are grown.



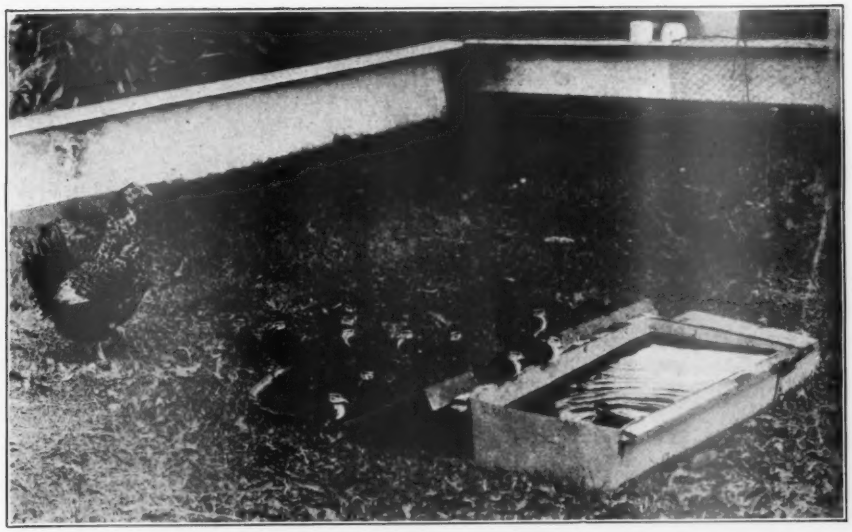
MALE GREEN-WINGED TEAL

The teal are the smallest of the ducks.

FEMALE GREEN WINGED TEAL

The bright colors are restricted to the male ducks.

With the exception of the wood duck, all the dabbling ducks regularly nest on the ground, usually near water but sometimes a half a mile from it and in quite exposed situations. The nests are crude affairs of grasses and weeds but as incubation proceeds, the female plucks down from her breast with which she covers the eggs to



A FOSTER MOTHER AND HER BROOD OF YOUNG WOOD DUCKS

The wood duck has become rare over most of its extensive range but will probably not become exterminated as it is protected by law and can now be reared successfully in captivity.

make them inconspicuous and to keep them warm while she leaves them to feed. For the males never assist in household cares, but, as soon as the eggs are laid, congregate in flocks by themselves and show no further interest. The wood duck is a notable exception for, in the first place it nests in a hole in a tree and in the second place the male attends the female and sometimes assists in incubation and such care as the young receive.

The wood duck has always been much in demand because of its bright colors and since it is not a very wary bird, it has fallen an easy prey to gunners until it has become very rare over a large part of its extensive range. As a result, the Federal Government has now declared a closed season upon it for a term of years. Fortunately it is now quite easily reared in captivity and is, therefore, in no danger of absolute extinction.

HOW THE DABBLING DUCKS FEED

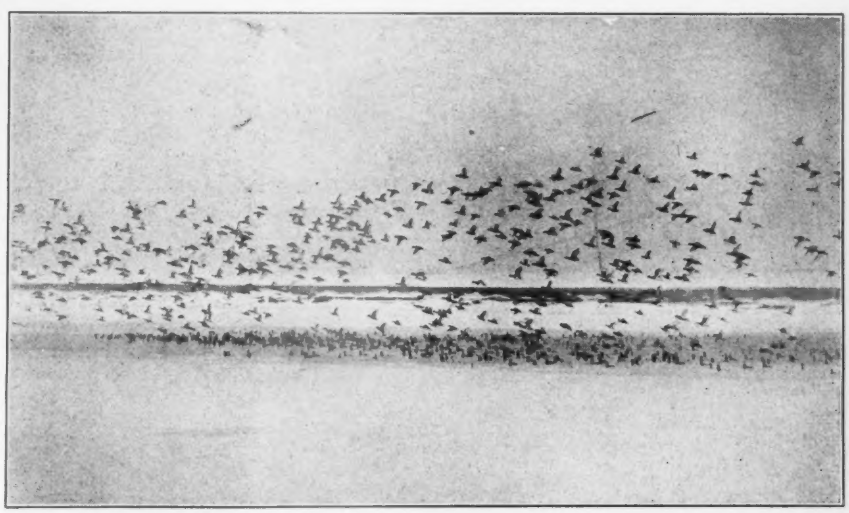
A female pintail "dabbling" in shallow water.

THE DIVING DUCKS

There are seventeen species of diving ducks found in North America and some of the species are the most abundant of our ducks, flocks of several thousand scaup ducks, for example, being a not uncommon sight on our larger bodies of water. The diving ability of these ducks can scarcely be exaggerated for some members of the sub-family, notably the old squaws, are repeatedly captured in gill nets set for fish in from 100 to 150 feet of water. Indeed, almost every year in the Great Lakes, thousands of these ducks become entangled in the nets and are drowned. The old squaws, scoters and eiders are believed to use their wings as well as their feet in diving, but the rest use

A MALE CANVASBACK STANDING

Note the large feet and erect posture characteristic of the diving ducks and compare with the mallards and teal.



Photograph by F. Overton

A FEW SCAUPS DUCKS, OR BROADBILLS AS THEY ARE KNOWN ON LONG ISLAND WHERE THIS PHOTOGRAPH WAS TAKEN

The Diving ducks occur in much larger flocks than the dabbling ducks; this is but part of the flock.

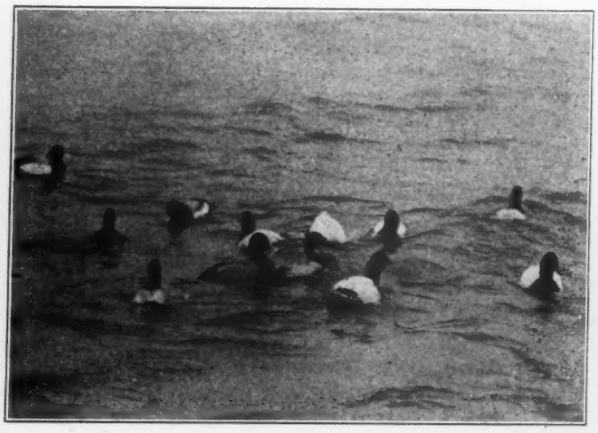
only their feet which are much larger than in the dabbling ducks. Their feet are likewise set farther back so that when on land they stand more erect or rest on their breasts and walk with difficulty. In nesting they prefer the marshes so that they can slip from their nests into the water without having to walk on dry land. With the exception of the ruddy duck they are northern breed-

BLACK DUCKS WINTERING WITH CANVASBACKS ON CAYUGA

The Black ducks are dabbling ducks, the canvasbacks divers. Note that the blacks rest higher on the water and hold their tails up from the water.

ing ducks, nesting from the northern tier of states northward.

The choicest of all the diving ducks is the canvasback, so-called from the white back of the male. The back of the female is gray and the head and neck cinnamon brown instead of rufous as in the male. A somewhat similar species is the redhead whose head is brighter red and whose back is grayer, not to mention other differ-



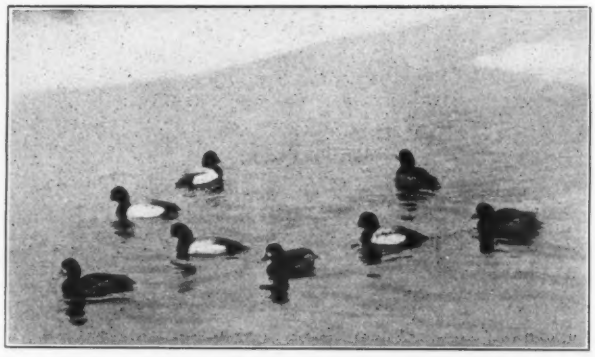
A RED HEAD AMONG THE CANVASBACKS AND SCAUP DUCKS

The Redhead is following a female Canvasback in the center of the picture. Note the difference in profiles.

ences. The long bill and sloping profile of the canvasback is a good distinguishing mark in any plumage for it can be distinguished at a considerable distance. The reputation of the canvasback has been gained largely through its habit of feeding upon wild celery (Valisneria) which is believed to impart a pleasant flavor.

Other ducks of this group are the greater and lesser scaup ducks, blue bills, broad bills or black heads as they are variously called, the ring-necked duck, the curious little ruddy duck with its upturned tail, the two species of golden-eyes and the bufflehead (which nest in trees, the scoters or sea coots of three species, and the four species of eider ducks from which comes the eider down of commerce.

The Laborador duck, another of the diving group, which formerly occurred in numbers along the Atlantic coast, in winter, as far south as New Jersey, is now extinct. The last specimen of this species was taken in



SCAUP DUCK FEEDING AT THE EDGE OF THE ICE

The males have the white flanks the females the white at the base of the bill.

1871 but the cause of its extinction is not known. It is suggestive, however, of what may occur to many others of our ducks if constant watchfulness is not maintained to adjust the protective laws to any decrease that may occur. The wild fowl are a great asset to the nation and we can ill afford to lose them. We must, therefore, keep up a constant vigilance to see that our laws give them all the protection they need and that these laws are respected and enforced.

CANVASBACKS WINTERING ON CAYUGA

There are a few Scaup ducks in the background. A Canvasback in the foreground is in the act of diving.

VARIOUS PARASITIC PLANTS; WITH AN OWL STORY

BY DR. R. W. SHUFELDT

FELLOW AMERICAN ORNITHOL. UNION, ETC.

(PHOTOGRAPHS BY THE AUTHOR)

TO THOSE who chance to reside in the District of Columbia, and are familiar with the adjacent territorial regions of Virginia and Maryland, it is hardly necessary to point out that all through this part of the country winter frequently holds nearly everything in nature in a very firm grip during the entire month of March. It is quite the exception when the reverse of this happens to be the case; and, as a matter of fact, should this first lap of spring be open or hard, the state of affairs with respect to flowers and other vegetation, in localities where they are so abundant in the woods and fields in spring, summer, and autumn, is the same—they have vanished. The trees are bare; and should there be snow on the ground, the only evidences of the plant life of the previous season are, here and there, the lifeless remains of the stalks of golden-rod, burdock, turtle-head, and a few other plants. But, as in other lands, there are winters and winters, and to this Washington forms no exception. Some are practically of spring-like mildness from beginning to end, so that when March comes around, the month really begins and ends with days like those of the middle of April.

In and around the celebrated Rock Creek Park of Washington, we may see, in a stormy March, just such scenes as we have in Figure 1; or, within the limits of the "Zoo," such a wintry one as is depicted in Figure 2. When this chances to be the kind of season that comes to pass, it is idle to think of such a thing as a botanizing trip. So we must resort to the next best thing, and go carefully over our last year's notes and photographs, selecting some interesting group or two wherewith to fill in a March story. For example, such a group may be seen in the one to which the Cancer-roots and Broom-rapes belong.

In suitable localities, the One-flowered Cancer-root may be found from Newfoundland to Virginia, thence across

WILD FOWL IN THE WASHINGTON "ZOO"

Fig. 1—Were we to leave out the little bridge and the rail fence, this wild swan and the Canada geese would make a very correct representation as to how these elegant game birds appear in their native haunts in the winter time.

the country to Texas, and westward to the Pacific coast. Usually it is found growing in damp or even wet woods, beneath the rank vegetation that most often is high above it. It is not very abundant in the neighborhood of Washington, the specimen shown in Figure 3 being the first one discovered for some years; it was found near the bank of a tiny stream that coursed through a swampy piece of woods, not far from a ford leading into Rock Creek Park. As will be noted in the illustration, this beautiful and delicate little flower tops a slender and quite naked stem. Each blossom is tubular and five-lobed,

Fig. 5—IN THIS CUT WE HAVE ANOTHER CURIOUS PLANT OF THE HEATH FAMILY, WHICH LIKEWISE HAS BEEN CALLED "PINESAP," THOUGH IT IS MORE GENERALLY KNOWN BY THE NAME OF FALSE BEECH DROPS (*Monotropa hypopitys*)

False Beech Drops, as a plant, belongs in the same genus with the Indian Pipe, nothwithstanding the fact that the summit of its stem is not invariably "turned to one side."

the color being sometimes white, but most often pale violet or even purple. It possesses a faint, sweet fragrance, and to some extent this may attract the small bees that are responsible for its cross-fertilization.

This Naked Broom-rape, as it is sometimes called, is a leafless, parasitic plant that thrives upon the sap of other plants; that is to say, it is by nature parasitic—hence its lack of leaves. It rarely grows over six inches in height, and quite often several of them are found loosely bunched in a group. In Figure 3 the plants are seen to be growing near a rock, among blades of some swamp-grass; others near them grew at the foot of a beech tree.

Passing next to the Heath family, which is widely separated from the Broom-rapes, we find a remarkable as well as famous plant in the Indian Pipe, also known as Pine-sap and Ghost-plant. The group shown in Figure 4 was taken natural size, as in the case of all the other plants in this article, just as they grew in a forest of big pines and oaks. This genus has been named *Monotropa* for the reason that its flower-head turns to one side, and it only becomes erect when it goes to seed. Gray describes it briefly in the following words: "Low and fleshy herbs, tawny, reddish, or white; parasitic on roots, or growing upon decomposing vegetable matter; the clustered stems spring from a ball of matted, fibrous rootlets; furnished with scales or bracts in place of leaves; one to several flowered." The origin of the name is from the Greek. He claims that Indian Pipe is found in Mexico as well as in Asia. When picked, it soon shrivels up and turns a sooty black; while, if carried home with care, with plenty of moist, rich earth about its roots and planted in a proper environment, it will thrive

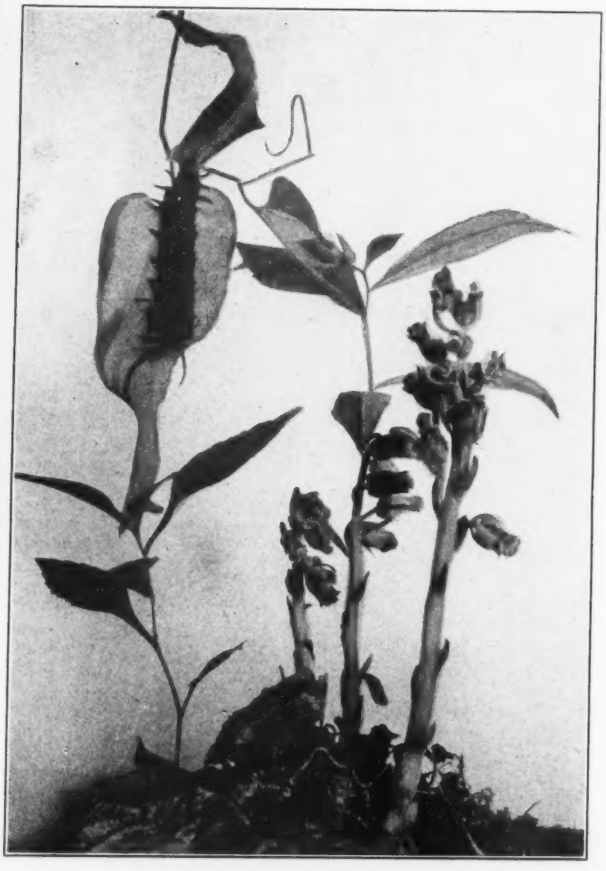


Fig. 6—THE GROUP OF FALSE BEECH DROPS HERE SHOWN IN FIGURE 5 WERE PHOTOGRAPHED IN SITU. IN THIS CUT WE HAVE ANOTHER SPECIMEN WITH THE SURROUNDINGS CLEARED AWAY, IN THAT THE PLANT MAY BE MORE SATISFACTORILY STUDIED

The remarkable caterpillar shown on the suspended leaf is the larva of the Pipevine Swallowtail Butterfly (*Papilio philenor*), a beautiful form of that famous genus.

and eventually go to seed—its life-cycle offering, upon the whole, a most interesting and instructive chapter in the study of one of the most curious growths we have in our entire flora.

Mathews says of the Indian Pipe that when it goes to seed "the enlarged ovary finally assumes an erect

position, becoming a pale, tawny salmon color; it is usually ten-grooved and five-celled, and forms a large, fleshy, ovoid seed-vessel." In favorable localities we may meet with a considerable number of Indian Pipe plants growing in the same piece of woods. In the hilly, timbered country north of Cabin John Bridge, west of Washington, is a great place to find them along in June; while further South, as in southern Virginia, they put in an appearance much earlier.

Fig. 3—OUR "ONE-FLOWERED CANCER-ROOT" IS A CURIOUS PLANT AND THIS IS AN UNUSUALLY FINE SPECIMEN

The Broom-rape family (*Orobanchaceae*), to which this plant belongs, is not a very extensive one; its representatives, upon the other hand, possess a special interest for us.

Gray divides the genus *Monotropa* into two groups or subgenera, namely, the *Eumonotropa*, represented by the Indian Pipe, and the *Hypopitys*, created to contain, in so far as eastern United States botany goes, *Monotropa hypopitys*, the vernacular name for which is Pinesap or False Beech Drops.

By way of explanation, it may be said that the plant called Beech Drops or Cancer-Root, belongs in the Broom-rape family (*Orobanchaceae*), in which the One-flowered Cancer-root (*O. uniflora*), described above, is found. True Beech-drops are not figured in the present article for the reason that, up to date, no specimens have been met with. As compared with False Beech-drops, it is a very different appearing plant (Figs. 5 and 6).

Quoting Mathews for these Beech-drops, he tells us that it is "a parasitic plant, which draws its sustenance from the roots of the beech tree. The stem is tough, straight, almost upright-branched, stained with brown madder, and set with a few small, dry scales. The *curved*, tubular, dull magenta and buff-brown *upper* flowers are purple-striped; although generally sterile they are complete in every part, the style slightly protruding beyond, and the stamens just within the throat. The tiny lower flowers are cleistogamous — closed to outward agencies and self-fertilized. A few of the upper flowers are cross-fertilized by bees. 6-20 inches high. Beech woods, Maine, south and west to Wisconsin and Missouri. The name means *on the beech.*"

Fig. 4—HERE IS A GROUP OF INDIAN PIPE PLANTS TAKEN IN SITU, JUST AS THEY GREW IN NATURE. (*Monotropa uniflora*)

Indian Pipe is likewise called Corpse Plants and Pinesap, and some of its relatives in the Heath family (*Erincaceae*) are White Alder, Shin Leaf, Laurels, Azaleas, Cranberries, Huckleberries and a vast host of others.

Fig. 2—THE SOUTH VIEW OF THE MAMMAL HOUSE IN THE NATIONAL "ZOO" WITH ITS LOW, SQUARE TOWER—THIS BUILDING PRESENTS A MOST ATTRACTIVE PICTURE IN WINTER DRESS.

Related to these Beech-drops, and in the same Broom-rape family, we have still another genus of parasitic plants, also represented by a single species, known as Squaw-root or Cancer-root. This genus is *Conopholis*, and the plant referred to is *C. americana*; it

occurs over the greater part of eastern United States. Good descriptions of it will be found in most all the works devoted to the plants of the region just named.

Dissimilar as they are in general appearance, in all the botanies we find the Spotted Wintergreen (Figure 7) placed, in classification, as a close relative of the Indian Pipe; but then, as pointed out elsewhere, the Heath family, composed as it is of both shrubs and herbs, is a very heterogenous assemblage of plants. The Spotted Wintergreen referred to, *Chimaphila maculata,* is generally found growing in dense pine woods, where, with its dark green, white-striped leaves, it is a plant sure of attracting attention. The form of the leaves, as well as the appearance of the flowers, are well shown in the accompanying illustration. Individual plants differ with respect to the striping of the leaves, some being very strong and conspicuous, and also as to the number of flowers. Often the latter is single; but as a matter of fact, there may be as many as five on one plant. The leaves are pointed and remotely toothed along their margins; moreover, they are generally curved from stem to point, the convex surface being uppermost, which latter is quite shiny. The white striping is on the upper aspect and in the neighborhood of the ribs or veins. Pipsissiwa may attain a height of eight or nine inches, but the majority of plants met with are shorter than this. It flowers during mid-summer, and has a range over the northern tier of States to Minnesota, southward to Georgia and Mississippi. As will be noted in the cut, the stalks bearing the beautiful flowers are long, slender and generally straight; they are, too, of a bright ruddy color. Each flower is borne at the end of a separate downward-curved stem, which is about an inch in length. Before bursting open, they are pretty little white balls, with their stems more distinctly curved downward, than they are after blooming.

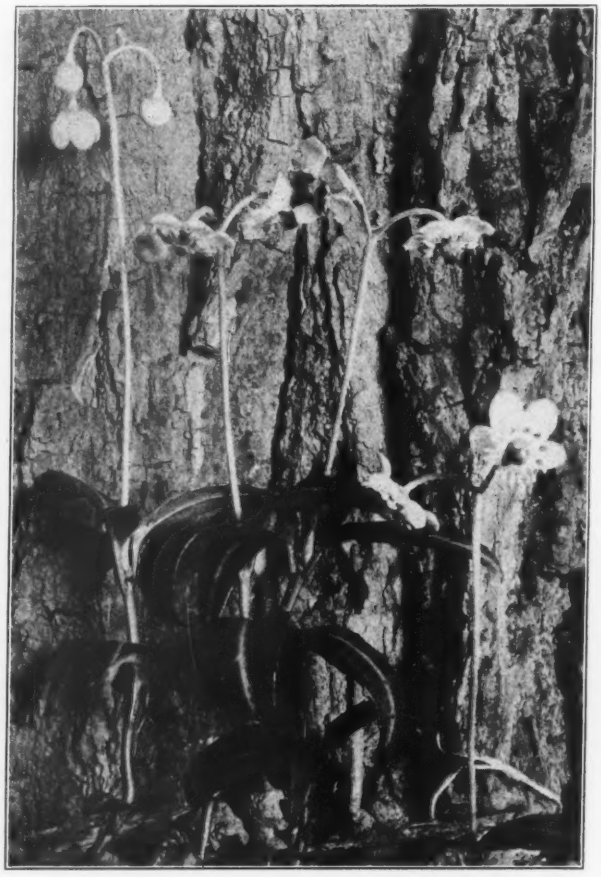


Fig. 7—IN THE HEATH FAMILY WE ALSO HAVE THE GENUS *Chimaphila*, OF WHICH THERE ARE TWO SPECIES. THE PLANT HERE SHOWN IS ONE OF THEM, ITS COMMON NAME BEING THE SPOTTED WINTERGREEN (*C. maculata*)

Chimaphila derives its name from two Greek words, which together mean to love the winter.

A close relative of the Spotted Wintergreen is another Pipsissiwa, called Prince's Pine (*Chimaphila umbellata*); it is said to be more abundant than the Spotted form, with its leaves arranged in two whorls about the stem at quite an interval apart. These leaves are not pointed as in *C. maculata,* but broadened at their outer ends; neither are they spotted. They are shiny and curved downwards. The flowers of this species closely resemble those of the Spotted variety, and rarely exceed five to the plant; its range is about the same.

Closely related to these *Chimaphilas* are two other genera, namely, the genus *Monesis* and the genus *Pyrola.* In the first we have the One-flowered Pyrola (*M. uniflora*) and in the latter the Shin-leaf (*Pyrola eleliptica*). The last-named ones, says Reed, "is the most common of the Pyrolas. The evergreen leaves are bright green, obscurely toothed, broadly elliptical, and narrowing into long stems that clasp at the base. During May a long, smooth scape springs from the middle of the group of basal leaves to a height of five or ten inches, bearing, near its top, a raceme of several flowers. It is common throughout the United States and southern Canada." Reed does not say what the flowers are like, while another author at hand says that there are from seven to fifteen of these; that they are waxen, greenish-white in color, and very fragrant. As its name indicates, the One-flowered Wintergreen or Pyrola bears but a single flower on its upright stem, which is usually about five inches in height, though frequently it is much shorter. The flower is either white or pale pink, and does not differ very widely from a Wintergreen blossom. It is waxy and has five petals, and often measures half an inch across. At first the upper end of the stem is crooked over; but after going to seed, the pod stands erect at the summit of the stem. Sometimes it occurs growing in colonies, and is then sure of attracting attention. This is invariably in the high, dry woods of the northeastern section of the United States, westward to Minnesota, and southward to the District of Columbia. It is usually in flower along in mid-summer, and it surely is one of the prettiest little plants of our woodland flora.

Passing from flowers to Owls, attention is here invited to the Barred Owl (*Strix v. varia*) which has, for over two years, occupied a commodious cage all to himself in

the Bird House in the National "Zoo" at Washington, and which has a very interesting history. At this writing he is full grown, and in very beautiful plumage, while at the time of his capture he was in the pure white, downy stage of the young of this species, and, like most young owls, a most remarkable-looking bird. It was at this stage of his growth that I penned an account of his capture, and published it in a popular journal in New England somewhere. That story was illustrated, in so far as this particular owl was concerned, by a reproduction of a photograph I made of it, which showed the attitude it assumed when asleep. This attitude is most extraordinary, as it squats down upon its perch, and allows its head and neck to hang way down below it, for a distance of at least ten inches or more. There are those who will be interested to know what this Barred Owl looked like when it first left the hollow in the tree that its parents had selected as a nesting place. This I secured a few days after it came into my possession, and a reproduction of the photograph illustrates this brief biography.

Fig. 9—NESTLING OF THE BARRED OWL (*Strix v. varia*), A WELL KNOWN SPECIES OF THIS COUNTRY. ALTHOUGH NOW FULLY GROWN, THIS BIRD RECEIVES BOTH ROOM AND BOARD FREE FROM THE GOVERNMENT AT THE NATIONAL ZOOLOGICAL PARK AT WASHINGTON.

It will be of interest to know that of the large number of species of owls we have in this country, that in the case of the owllets their first plumage is almost invariably white and downy as in the case of this young Barred Owl.

CRATER LAKE SHELL HOLE

CRATER LAKE was recently most aptly described by Representative Sinnot, of Oregon, when speaking from the floor of the House as follows:

"Crater Lake, cauldron-like and circular, 7,000 feet high, is perched amid the peaks. Perpendicular sides of slaggy lava rise over a thousand feet from waters of indigo blue six miles across and 2,000 feet deep.

"To the scientist, a mighty volcano collapsed within itself, Mount Mazama, 15,000 feet high, telescoped.

"To the poet, 'the sea of silence,' 'a lake of mystery.'

"To me, a shell hole of a war of worlds—who knows?

"Could the great blind poet have seen this marvel ere his pen had Lucifer and his host of rebel angels—

Hurled headlong flaming from the ethereal sky,
With hideous ruin and combustion, down—

in Miltonic imagery here he'd have found the impact."

COPIES of the Roster of American Foresters and Lumbermen in Military Service—final publication—are available on request. This is a reprint from the November issue of AMERICAN FORESTRY, containing additions and changes received up to November 15, 1918. Address American Forestry Association, Washington, District of Columbia.

NEW ENGLAND FORESTRY CONGRESS

THE two-day session of the New England Forestry Congress held in Boston, February 24th and 25th marked the close of a period of fourteen years of development of state forestry in Massachusetts, and brought together many of the foremost foresters of the country for a general review and discussion of the place of forestry in public economy. In spite of the celebration due to the arrival of President Wilson on the 24th, the sessions were well attended and the audience followed the discussions with closest attention. Thirteen papers were given, each of which dealt with some subject of direct interest and was discussed not on the basis of theory or sentiment but from the results of experience and practical application. The first session was devoted to a consideration of the economic importance of forestry. The waterpower situation in New England and its dependence on forest protection was set forth by Henry I. Harriman, President of the Boston Chamber of Commerce. Richard T. Fisher, Director of the Harvard Forest and head of the Forest School gave an illuminating talk on "Home Grown Timber, the Hope of the Wood Using Industries of New England" in which he emphasized the facts which the average man has so far failed to grasp, namely, that it does not pay to have to ship timber 3,000 miles and pay freight charges, while at the same time the land capable of growing this timber lies idle at the factory doors. Ellwood Wilson, whose Company, the Laurentide Paper Company is spending $100,000 per year in reforestation, set forth "The Relation of Pulp and Paper Manufacture to Forestry."

In the afternoon on Monday, while the guns were booming the salutes to the President and cheering crowds swayed round the Copley Plaza, the program of the meeting, somewhat more thinly attended, proceeded within. Dr. Metcalf, Chief of the Division of Forest Pathology of the United States Bureau of Plant Industry discussed "Fungus Diseases at Work in our Forests" and brought up to date the knowledge of the White Pine Blister Rust. E. C. Hirst, State Forester of New Hampshire, recently returned from the management of the ten sawmill units sent to Scotland, talked on "Co-operation in Forest Fire Protection." Commissioner George D. Pratt of New York gave an illustrated lecture on the work of the Conservation Commission in protecting the Adirondacks.

In the evening, at the banquet given at the Copley Plaza, Forester Henry S. Graves gave an address on "The Need of Private Forestry" which should be in the hands of every citizen. His analysis of the economic situation with which this country is faced, and the relation of private timber holdings to the problem may well serve as a basis for constructive efforts in the future.

On Tuesday, the morning session was devoted to "State Forest Policy." Dr. J. T. Rothrock, the veteran state forest commissioner of Pennsylvania, now retired, discussed the problems of re-organization now facing that department and strongly advocated the continuance of the separate department under which the work had developed.

H. H. Chapman, Professor of Forest Management of the Yale Forest School, discussed "State Forest Policies in the United States." The principle emphasis of this discussion was laid on the necessity of maintaining separate departments of Forestry instead of effecting consolidations with other branches of state activity. Massachusetts is faced with a re-organization of this kind, and there is a serious danger that the initiative and efficiency of the work will suffer unless kept in a department free to develop and cope with the big problems which it faces. It was shown by Mr. Chapman that out of thirty states with forest organizations, fourteen had kept the work of forestry entirely independent, three more practically so by nominal connection with state land departments, six had tried combination with fish and game protection, four with state geology, two with state experiment stations and but one with State Boards of Agriculture. The effect of these combinations on forestry was in each case determined by the degree to which forestry officials were subordinated to other officials. Game wardens have almost never succeeded in developing a progressive program of forestry, no matter how well intentioned they might be. State geologists have had better success—being scientists and specialists themselves they have given the State Forester the initiative and sympathetic support needed. Foresters connected with Agricultural Experiment Stations have been free to develop forest education and demonstrations for encouragement of private forestry, for much the same reason—just as the members of a college faculty are given freedom of initiation in research.

But the one experiment in combining State forestry with agriculture in the State of Vermont proved a failure, and enabled the interests which are always seeking an opportunity to control State departments for their own ends to overturn this department, oust the State Forester, against whom not a shadow of criticism could be found, and reduce the office of Forester to that of an unimportant subordinate of the Commissioner. It was strongly urged that Massachusetts recognize the tremendous economic interests at stake—with three-fifths of the area of the State suitable chiefly for forest production—and set the work on a firm foundation by the maintenance of a separate State Forestry Department.

This view was supported by the Congress, which passed strong resolutions to that effect.

A paper was read from Dr. B. E. Fernow, the dean of American foresters, on "Forestry Policies of Foreign Countries." One of the most instructive papers was by W. R. Brown on "Results of Twenty-five Years' Clean Cutting and Selective Cutting in New England." This paper was a digest of what had actually happened following the efforts of the Berlin Mills Company to practice forestry on their holdings. Facts such as have been shown on these cuttings will be the basis of all successful

future operations in forest management, and this paper will serve as a starting point for a new era in silvicultural practice in the spruce regions.

Forrest H. Colby, Forest Commissioner of Maine, followed with a discussion on slash disposal. The final number was on the subject of "Forest Research," by Prof. J. W. Toumey, of the Yale Forest School.

The Congress passed resolutions favoring the extension of the operation of the Weeks law, the undertaking of a timber census, the extension of regulation of the management of private lands by insistence on proper fire protection and the adoption of measures which will insure the protection of the land for timber production, the passage of a bill by Congress extending aid to forest research by States and urging the State of Massachusetts to maintain a separate State Forestry Department.

The meeting was conducted under the auspices of the Boston Chamber of Commerce and the Massachusetts Forestry Association. The proceedings will be published, and will thus be made available to foresters and the general public.

EDITORIAL

REORGANIZATION IN MASSACHUSETTS

FORESTRY in Massachusetts is facing the problem of reorganization. The Constitution provides that all of the State's activities, now numbering some 110 departments, must be reorganized into not more than 20. The wisdom of such a provision is not a subject of debate, since the matter is settled. It remains to determine what will become of State forestry in the scramble.

The answer depends upon the attitude which the people of Massachusetts take toward State forestry and their estimate of its relative importance in the general scheme of things. First, is forestry of sufficient importance in the economic welfare of the State to merit a separate organization as one of 20 departments? Second, if not, what combination will give the best results for forestry and for the public?

The handicap under which forestry as a public policy has suffered in this country is a surprising lack of foresight and comprehension of what it means in the economic life of the average man. Prices of wood products go up at a rate faster than that of other commodities, and the public grumbles and seeks for evidence of a lumber trust, when the cause lies in the denuded hills at their own doors and the freight bills on Oregon fir. Hindsight may be better than foresight. Many a bankrupt can understand the causes for his failure after it happens. We are steadily bankrupting our forest industries and riotiously expending the inheritance of nature, which we did not produce. Meanwhile there appears in our press such articles as "Timber's Horn of Plenty," in the *Literary Digest*, which lulls our senses to sleep by remarkable perversions of facts regarding the abundance of our timber supplies.

Three-fifths of the State's area unsuited for agriculture, but capable of producing 2,000,000,000 feet of timber annually, and with manufacturing industries dependent for their continuance on home-grown timber, and a lumber industry capable of employing permanently 30,000 men; with streams furnishing water power of tremendous value to her chief industries, and dependent absolutely on stream regulation through the maintenance of forest cover; with the scourge of the gypsy and brown-tail moths and the white pine blister rust calling for the united efforts of all organized forces to prevent the complete destruction of both forest and shade trees, the State of Massachusetts still hesitates whether to put State forestry as one of her 20 departments. Yet this department is now nineteenth in point of appropriations and number of employees among the 110 branches of the present government.

Perhaps it is because the work of this department has scarcely begun, and for lack of actual demonstration of results, that the department is looked upon as a minor branch of the State's activities. In other words, foresight is to be eliminated in this reorganization of Massachusetts State Forestry, and the departments are to be crystallized in their present form.

That is just the reason above all others which demands a separate organization for State forestry. It is NOT established—the tremendous need for rapid expansion is clear to all who have true foresight. How is the average citizen ever to be brought to realize his need and to support the economic program of reforestation, fire protection and regulated timber cutting unless the State Department of Forestry is free to expand this educational work and its demonstrations of practical results? And if one thing has been clearly demonstrated in our State governments, it is the fact that when forestry departments are subordinated as a minor branch of a large organization, the scope of the forestry work becomes limited to the ideas, not of the forester, who comprehends the situation, but to some game warden, agricultural commissioner, or highway engineer, who provides first for what he does comprehend and permits forestry to gather the crumbs which fall from his table.

The future of State forestry in Massachusetts is in the balance. Pennsylvania's wonderful progress in forestry followed a reorganization which created the Department of Forestry as a separate organization in 1901. Massachusetts cannot afford to overlook the task ahead, for there will come a time when camouflage and evasion of economic facts will no longer be accepted by the citizens of the commonwealth, and they will ask, "Why are not these things done, and what has the State Forestry Department been doing to enlighten us and to protect our welfare?" The answer will be: "In 1919 the citizens

of Massachusetts did not consider the State Forestry Department of sufficient importance to stand alone and bear its own responsibility for success or failure. You placed us under another department, and we have been powerless to grow to the measure of our responsibilities. The fault rests on your shoulders."

These are the questions to be met in the next few weeks by the great and general court of Massachusetts, which is trying to reach a wise solution of her problem. May we hope that they will have foresight, and place the responsibility of the forestry program squarely on the shoulders of a separate Forestry Department.

IDAHO FOR MORE NATIONAL FORESTS

ON March 3, 1907, Congress prohibited the further creation of National Forests by Presidential Proclamation in the States of Washington, Oregon, Idaho, Montana, Wyoming, and Colorado. The late Theodore Roosevelt before signing this bill used the authority of which he was about to deprive himself in creating extensive areas of new National Forests in the six States mentioned. At the time, this action aroused tremendous protest, and was looked upon as a defiance of the wishes of Congress.

That the action of the President was in advance of public sentiment at the time no one will deny. In the State of Idaho especially a bitter antagonism existed towards the creation of National Forests, and this sentiment was actively expressed by the late Senator Heyburn. In the Thunder Mountain region of central Idaho a typical mining boom was under way, and out of deference to the wishes of the Senator and of the miners who feared Government restrictions, an area of 1,100,000 acres was omitted from the Proclamation and remained public land without National Forests, but entirely surrounded by them.

The period of 11 years which has elapsed has seen a tremendous reversal of public sentiment in every one of the above States. The Legislature of the State of Idaho has for two successive sessions passed resolutions petitioning Congress to create a National Forest out of this rejected Thunder Mountain area. In the last session both Houses of the Legislature passed this petition unanimously, while in the previous session there was but one dissenting vote in either House.

What is the reason for this change? The answer is a demonstration on the ground of the benefits of National Forest Service administration compared with the evils of unregulated use of public domain. The Thunder Mountain region has but one-half of one per cent of land fit for agriculture. Experience has abundantly demonstrated that nonagricultural timbered lands in the West are best regulated by National ownership and management under the principles adopted by the Forest Service. The Legislature of Idaho backed by all of the economic interests of the State now set forth in their memorial to Congress:

1. That fires range unchecked in this region and have destroyed 700 million feet of timber.

2. That the old roads built in the time of the boom have gone to pieces, and that for lack of transportation, and of State and local funds to develop roads, mining and water power development are impossible.

3. That wild life is being exterminated.

4. That hordes of sheep from Oregon invade this region annually, and are converting the entire area into a dust heap.

5. That no revenue whatever is being yielded by the resources of the region for the benefit of the State.

It is conspicuously true that this region whose carrying capacity for sheep is not over 75,000 is grazed by at least four times that number annually, and that local stockmen and settlers have no rights whatever. The indictment against the system of private initiative and "laissez faire" is a heavy one. What is the cure?

According to the Idaho Legislature, "Inclusion of said area within a National Forest would eliminate the annual destruction of timber by forest fire; make it possible for homestead settlers to secure titles to their lands under the Forest Homestead Act; give adequate system of regulated range use, thus conserving and perpetuating the forage resources for the benefit of the local residents and tax payers; make it possible for the State to realize its equity in the lands by relinquishing the unsurveyed school lands and selecting lands elsewhere; increase the revenue of the county and State through the receipt of 35 per cent of the gross receipts collected by the Forest Service; enlarge the power of the State to share in the benefits of the Federal Aid Road Act; and otherwise to assist in opening to development and use the vast National resources of the Thunder Mountain region."

This region on account of its inaccessibility has no value as a National Park. The surrounding area under National Forest administration has developed rapidly and the new road legislation will further stimulate this process.

The American Forestry Association has from the first stood firmly on the platform that National ownership and management of National Forests was fundamental to the welfare of Western States, and has resisted all efforts to secure support for the pernicious doctrine of dispersal and cession of these National possessions to the State. The State of Idaho is the latest convert to this doctrine, but apparently its conversion is thorough and complete.

THE Seventh Annual Meeting of the New York State Forestry Association was a most successful one and a great deal of interest was manifested in the discussion of a broad and varied program. Important addresses were delivered by Dean Hugh P. Baker, of the New York State College of Forestry at Syracuse; Prof. Ralph S. Hosmer, of the Department of Forestry at Cornell, and others.

"BIDDY", AN ORIGINAL BIRD

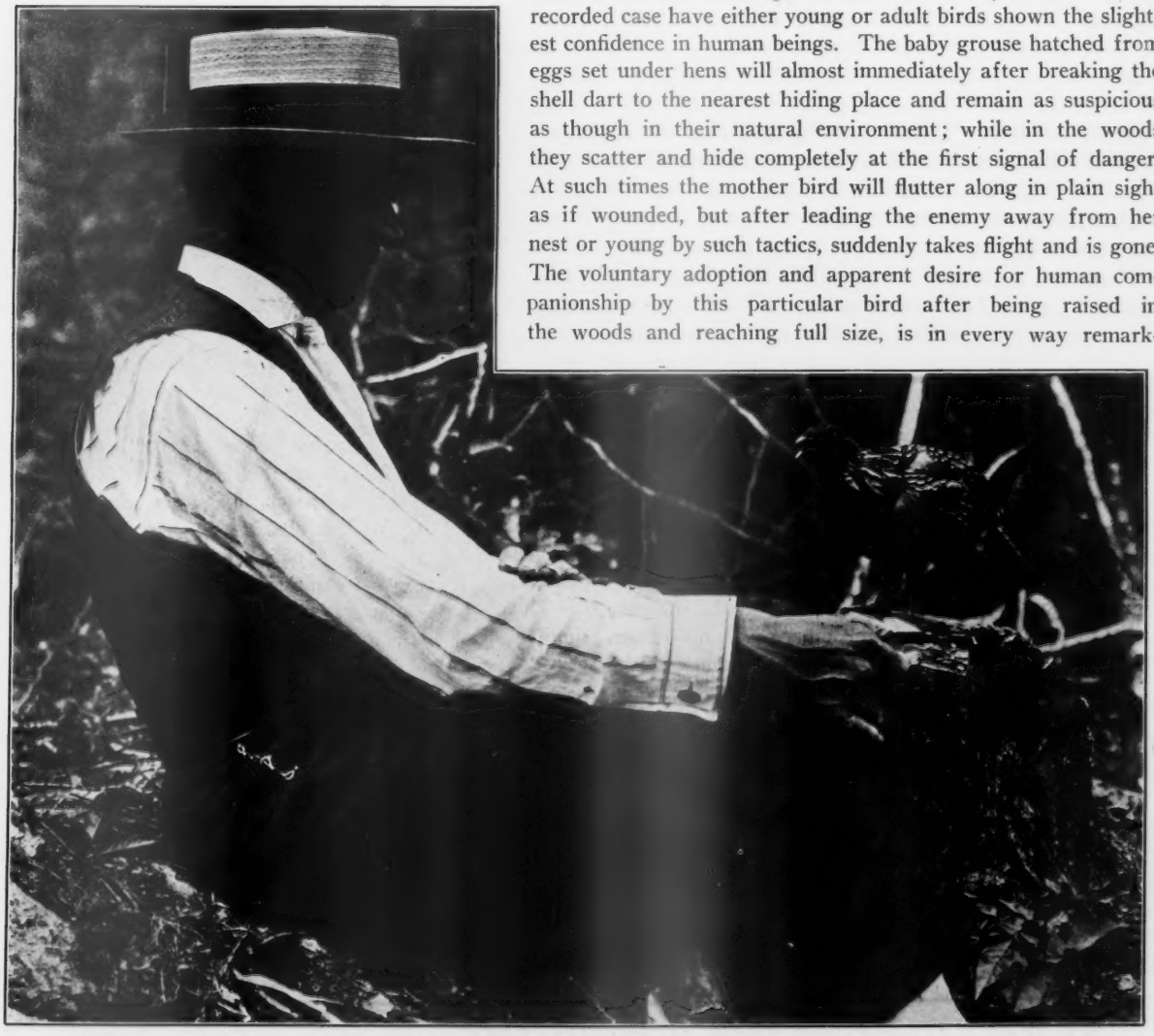
BY CLINTON G. ABBOTT

"BIDDY" did something no other grouse was ever known to do. This in itself is quite an achievement in an old world in which it is supposedly impossible to be original. Perhaps at some unknown time or in some obscure place, under an environment which creates a like line of bird thought, some other Biddy did what this remarkable bird has done. If so, there is no known record of it.

To relieve the suspense and start the narrative, it should be known that "Biddy" tamed herself, and thereby got into the movies. Be it further known that the proper name of the bird to which this pet name is applied is the ruffed grouse, although incorrectly called the partridge in parts of the north woods. All of her family are beautifully marked and extremely shy woods birds, which shoot up from your feet with a rushing whirr of wings. The camouflage of her striped brown coat is protection from the keenest eyes, so that the danger of detection is slight, except during the flashing flight to greater safety.

The still and moving pictures of Biddy and the story of her unique adoption of man was told by the writer in a talk on Wild Life in the New York State Forests, at the September meeting of the New York State Forestry Association at Lake Placid Club, New York.

The appearance of this particular bird, both in the movies and in print, is due to the fact that all attempts to tame or domesticate the ruffed grouse have absolutely failed. In no recorded case have either young or adult birds shown the slightest confidence in human beings. The baby grouse hatched from eggs set under hens will almost immediately after breaking the shell dart to the nearest hiding place and remain as suspicious as though in their natural environment; while in the woods they scatter and hide completely at the first signal of danger. At such times the mother bird will flutter along in plain sight as if wounded, but after leading the enemy away from her nest or young by such tactics, suddenly takes flight and is gone. The voluntary adoption and apparent desire for human companionship by this particular bird after being raised in the woods and reaching full size, is in every way remark-



AN UNUSUAL CONVERSATION

"Biddy"—the queer little bird which, in defiance of all recorded laws of instinct and habit, sought and apparently thoroughly enjoyed the companionship of man, her hereditary enemy.

able. The story is an unusual chapter in wild life.

During the past winter, while the snow was very deep in the woods and it was very difficult for the grouse to obtain food, the men of a logging crew in the Catskills noticed that a partridge (grouse) apparently attracted by the sound of chopping, came to where they were at work and accepted crumbs from their lunch baskets. Her confidence gradually increased and she became a regular guest of the men in this particular cutting, and with her need for food satisfied still seemed to enjoy human companionship. She even became so friendly as to perch herself on sled loads of logs and ride towards camp, and upon one occasion the men even had to push her off to keep her in the woods where she was safe.

When food became bounteous, after the snow went off in the spring, it was expected of course that Biddy would return to her own kind, and be guided by the wild attributes of her nature. Strangely enough, however, she continued to appear at about the same spot in the woods, and those who had become fond of her learned that the sound of chopping or the beating of sticks together was sufficient to bring her a long distance.

THE CONFIDENT APPROACH OF THE FRIENDLY LITTLE BIRD

Secure in her knowledge that a friend was calling, Biddy finally came, exhausted and warm, after traveling a long way—straight up to us, as if to say "Well, here I am."

Reports of this reached a local sportsman, who, by investigation, confirmed the story, and he later advised the Conservation Commission. The writer, therefore, packed up his camera and moving picture outfit, and with considerable doubt in his heart as to the outcome, visited this spot in the woods in company with his informant, one of the men who had been Biddy's friends during the winter. He was assured that by pounding two sticks together Biddy would appear to have her photograph taken, but when no bird appeared after beating for some time he became quite skeptical of the whole story. Biddy's friend, however, kept insisting she would come if she heard them, even a long way off in the woods. He explained that it might mean a long walk, since grouse do not usually resort to flight, except to escape danger.

Finally it came to look as though the writer's doubts were justified, and the man began to fear that his pet had fallen victim to some gun or animal. They, therefore, ceased "chopping" and sat down to eat their lunch. Before they finished the woodsman suddenly said: "There she is now," and out of the bushes walked Biddy. Her mouth was open, for it was a warm day, and her whole attitude was one of weariness, for she had apparently come for a long way. But she came straight up to them, as much as to say: "Well, here I am." She refused food, so her motive was not hunger, but the desire for human companionship.

The moving pictures taken by the writer show Biddy in a playful mood. She would rush up to them with feathers fluffed out, make a big show of fighting, much like a pet canary, then dart away to renew the attack. Rather rough treatment was taken in good part, and plainly understood by her as part of the game.

Thus it was that Biddy, the grouse, went into the movies, and built for herself a niche of fame in the bird kingdom of the Great North Woods.

RESEARCH WORK IN RECONSTRUCTION

A FORCE of nearly 400 employes of the United States Forest Products Laboratory is working in co-operation with the University of Wisconsin, on research work in connection with reconstruction.

The laboratory's war time achievements are unique in that practically all of them can be turned effectively to uses of peace. For example, the laboratory demonstrated the practicability of artificially drying freshly cut airplane stock, instead of storing it for a year or more in sheds to season. At the time of the signing of the armistice, airplane stock was being dried by the laboratory method faster than was necessary to meet the demands of the manufacturers.

More than 300 kinds of the type developed by the laboratory in various parts of the country, which were used in drying airplane material, gunstocks and vehicle parts, for the use of the Government in war, can now be turned to account in the pursuit of peaceful occupations.

WE WANT TO RECORD YOUR MEMORIAL TREE PLANTING. PLEASE ADVISE THE AMERICAN FORESTRY ASSOCIATION, WASHINGTON, D. C.

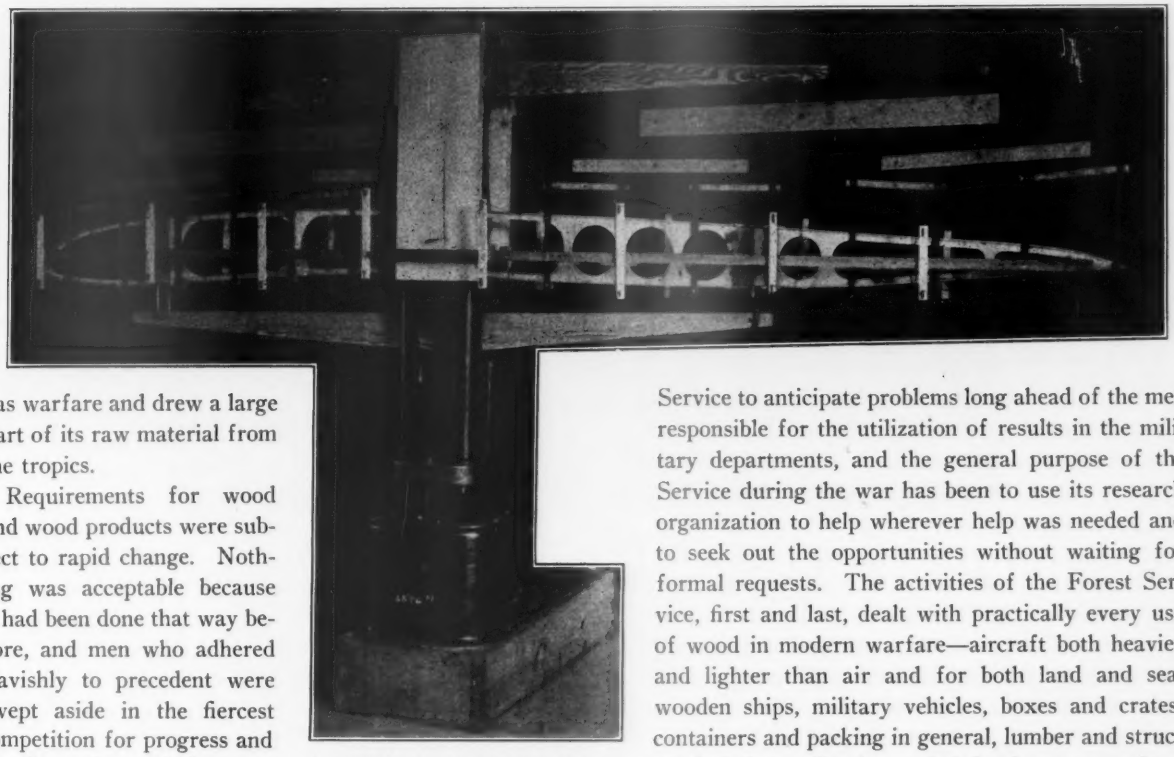
FOREST RESEARCH---IN THE WAR AND AFTER

BY EARLE H. CLAPP

ASSISTANT FORESTER, U. S. FOREST SERVICE

THE war has been full of surprises in its use of wood. The first year brought a wonderful change in the form of trench warfare, which carried with it an unprecedented demand for wood in many forms, a demand which, according to one French authority, utilized in some cases as high as a cubic meter of wood per linear meter of front. The requirements for airplanes established entirely new standards, which extended practically from the selection of the tree in the woods to the inspection of the final product in the completed plane. The commonplace wooden box assumed sufficient importance in connection with the general question of packing to warrant the formation of a special unit in the General Staff and later on in all of the bureaus of the War Department. Charcoal in many special forms, developed through the efforts of large numbers of research agencies in many countries, was a primary requisite in defensive gas warfare and drew a large part of its raw material from the tropics.

Requirements for wood and wood products were subject to rapid change. Nothing was acceptable because it had been done that way before, and men who adhered slavishly to precedent were swept aside in the fiercest competition for progress and excellence the world has ever known. The demand for correct technical practice extended from the simplest uses to the most complex, from the pick handle, the wooden box, and the gunstock to the highly complicated airplane.



A METHOD OF DETERMINING THE STRENGTH OF AIRPLAINE WING RIBS

An approximation of the air pressure in flight is secured by applying the load at many points by the system of levers. This method of testing has also been used to develop the strongest and lightest designs.

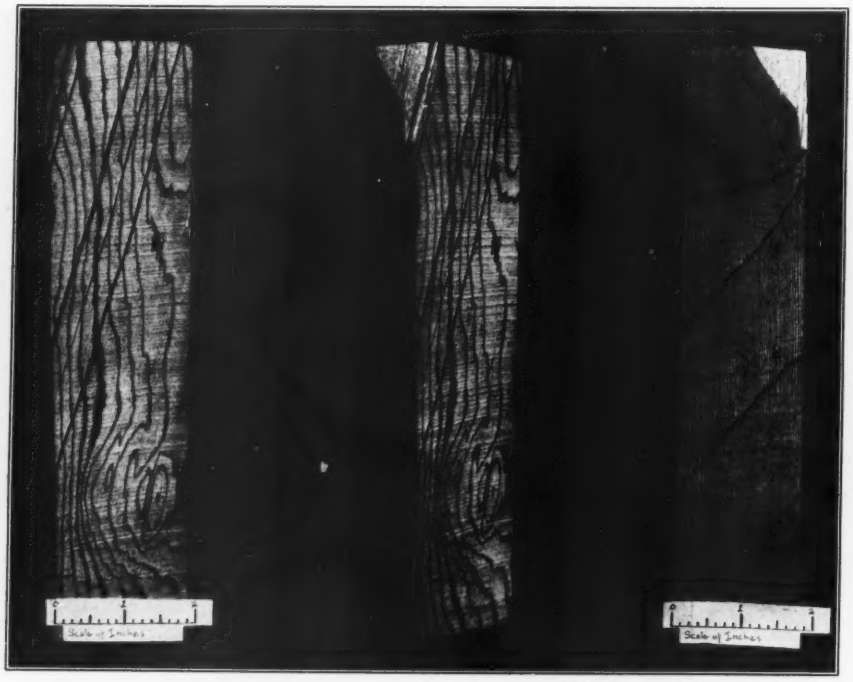
Some thirty years ago the Forest Service began the development of forest research as one of its earliest activities. Gradually the work has been gaining momentum. While the thought of preparation for war did not enter into it materially, the experience of the past year and a half has shown that in research the best preparation for peace may be a long step forward in effective preparation for war. A great volume of data was accumulated concerning the stand, distribution, and quality of our forests, concerning both technical and economic problems of production and manufacture, and concerning the mechanical, physical, and chemical properties of wood and how best it can be conditioned and utilized for many purposes. An organization of experts was developed which served as a splendid nucleus for a large expansion and which has supplied an invaluable background of knowledge, training, experience, and outlook.

The expert knowledge of wood and its problems gained through years of research frequently enabled the Forest Service to anticipate problems long ahead of the men responsible for the utilization of results in the military departments, and the general purpose of the Service during the war has been to use its research organization to help wherever help was needed and to seek out the opportunities without waiting for formal requests. The activities of the Forest Service, first and last, dealt with practically every use of wood in modern warfare—aircraft both heavier and lighter than air and for both land and sea, wooden ships, military vehicles, boxes and crates, containers and packing in general, lumber and structural timber, offensive and defensive gas warfare, grain alcohol, acetate of lime, pulp for explosives, hardwood distillation for various purposes, wooden limbs, fiber board, wooden pipe, implement handles, rosin for shrapnel, and naval stores products, tannin, noseplugs for shells, and various pulp products.

In order that the results secured might be known and used co-operative relationships were established and maintained with practically every one of the numerous Governmental agencies which dealt with the war: In the

War Department with the General Staff, the Bureau of Aircraft Production, Ordnance Department, Quartermaster General, Surgeon General, Engineer Corps, and Panama Canal; in the Navy Department with the Bureaus of Construction and Repair, Steam Engineering, Yards and Docks, and Supplies and Purchase; with the Shipping Board, Fleet Corporation, Fuel Administration, Director General of Railroads, Advisory Commission of Aeronautics, War Industries Board, War Trade Board, with several of our Allies, and with large numbers of war manufacturers.

Advice and assistance were rendered members of these organizations on foreign and domestic timber resources, their location, quality, production, and means of increasing production, on manufacturing processes, on the strength properties of wood and physical and chemical properties, the best substitutes, methods of drying, storing, finishing, and preserving woods, preparation and review of specifications, inspection and the training of men, and finally, on various economic questions relating to the wood-producing and wood-using industries. The activities of the organization in addition included whatever field and laboratory investigations were necessary to secure basic information.



CROSS GRAIN OR STRAIGHT?

Straight to any but the closest ocular inspection but shown to be worthless for airplane construction by the splitting test, the surest method of detecting cross grain in Sitka spruce. This apparently perfect piece of spruce would probably have broken in the air during the first maneuver.

Many things have been given the credit for winning the war—food, ships, money, and occasionally even fighting men and guns. No one questions the place of the airplane. The field was so new, the requirements so exacting, and so much was needed that the Forest Service centered its research largely on airplane problems. For the airplane the question of artificial drying of wood loomed early as one of first importance. Three-inch green spruce dries in the air in from one to two years. During our neutrality our Allies-to-be practically exhausted the reserve stock of dry Sitka spruce. Airplane authorities insisted that only air-dried stock was acceptable. The pressure of the Kaiser's armies, however, required some other answer. Forest Service kiln-drying specifications reduced the required period by twelve times, from years to an equal number of months, and the supply of dry spruce lost its sinister place as the controlling factor in airplane construction. These specifications were based on several years' investigative work mainly on other woods and for other purposes, and they have since been checked intensively. Theoretically, properly kiln-dried material should be better than air-dried material for the simple reason that it is possible in properly regulated kilns to maintain optimum conditions throughout the entire period of seasoning, whereas air-drying permits limited regulation only. If practice sustains theory, the result becomes one of first importance. The advantage in strength and toughness per unit of weight of spruce over its best substitutes is surprisingly small; but such as it was England crossed an ocean and a continent to secure her critically-needed supply, and the United States organized for its exploitation a body of men which in former wars would have been a large army. The work of the past year and a half has demonstrated that properly kiln-dried spruce is in fact stronger than that dried in the air even under the best conditions.

Vehicle makers in the United States before the war depended to a very large extent upon air-dried material. Specifications for escort wagons called for stock which did not conform to the standard sizes. The accumulated air-dried material on hand was available, therefore, only in small part, and it was necessary to go back to the sawmill to secure what was needed. Oak in large sizes for vehicle manufacture seasons naturally in two or three years. Dry material had to be secured in weeks. The kiln was again the only solution. The industry, however, did not have enough kilns, did not know proper methods of drying, and did not have trained operators. Losses from poor kilns or even good kilns inefficiently operated reached from 10 to 50 and even 100 per cent. The Rock Island Arsenal Record of December 26 shows what can be done by suitable kilns operated by competent men. Spokes for 56" artillery

wheels were dried with a loss of .37 of 1 per cent, spokes for 60″ wheels with a loss of .29 of 1 per cent, rims for 56″ wheels with a loss of 2 per cent, and rims for 60″ wheels with a loss of 1 per cent. But even more important than losses is time, and time has been reduced to one-twelfth. The type of kiln at the Rock Island Arsenal was developed at the Forest Products Laboratory, as were also the methods followed; and the man who assisted in the initial operation was a Service expert.

The drying of black walnut presented similar problems. Air-drying was the rule before the war. The demand for rifles required the use of kilns, and with the kilns came excessive losses. It is reported that one plant adhering to an imperfect schedule lost 60,000 gunstock blanks, valued at $1.20 each when green, in a single kiln run. Concerns following closely methods developed by the Forest Service have been turning out gunstocks with losses not uncommonly less than 1 per cent.

If the war had continued the supply of naturally-seasoned willow for artificial limbs would soon have been exhausted. For air seasoning a period of three to five years is necessary. Work under way at the Forest Products Laboratory promises to reduce this period to 60 or 70 days without increase in losses.

Photograph by H. D. Tiemann

DRY KILNS OF THE TIEMANN TYPE

Built in the Pacific Northwest for seasoning airplane stock by the Bureau of Aircraft Production these kilns have a daily capacity of 35,000 to 40,000 board feet of wing beam stock. From some of the charges there was no degrade due to drying. Each of the 24 kilns holds 6 loads similar to those shown.

A great volume of data on the strength of wood for practically all American species has been built up in the Forest Service during the past two decades. The number of individual tests amounted at the end of the war to no less than 300,000 and covered 130 American species. These tests were of constant and wide application during the war in airplane construction and for practically every other use where a knowledge of the strength of wood was required. For example, they permitted the preparation of tables showing strength values at 15 per cent moisture content which were adopted by both the Army and the Navy as a basis for the design of all wooden parts of aircraft. These data made it possible to select the species most suitable for airplanes and to be sure of the selection, and made it equally possible to reject unsuitable species. They showed that the variation in strength was so great as to render a considerable percentage of even the best woods unsuitable. By a density requirement it became possible to insure the selection of the strongest stock. By the admission of specified defects in lightly stressed parts it was possible practically to double the quantity of acceptable stock without sacrificing anything in safety. The latter problem involved little more than the application of data already available and the assignment of one man for a period of about three months. Many thousand men in the woods and at the mills would have been needed to produce the same quantity of spruce.

One country lost many planes in flight because spiral-grained spruce was used in construction. Forest Service tests prevented similar losses on our part by showing where the line between straight and spiral-grained material could be drawn safely. Little was known at the beginning of the war on the strength of plywood as a material. The need for this information was supplied very rapidly by an extensive series of tests which became the basis of all of the present plywood specifications and of plywood strength factors used in airplane design by both the Army and the Navy. In addition, the tests made it possible to adopt with safety the utilization of more species than had originally been thought suitable and thus prevented the supply of plywood from becoming, as it might easily have become, a factor controlling airplane production.

Further applications of strength data were found in the design of wing beams and wing ribs. Laminated wing beams, for example, offer the opportunity to utilize a much larger per cent of the spruce cut, a percentage far too low at the best. Special supplemental tests developed types of laminated and spliced wing beams as strong as the solid wing beam of our first planes, and the types developed have been adopted by the Army and Navy. As an example of the special supplemental tests on wing ribs may be cited those for an American combat plane produced in large numbers. The weight of the standard rib was reduced by one-third and the strength per unit of weight was increased three times. The wing so developed was adopted and similar designs were developed for six other Army and Navy planes. Strength tests had a further application in ship timber, and this and other information

served as a basis for a comprehensive series of recommendations to the American Bureau of Shipping and the Fleet Corporation on the specifications to be followed in the selection of timber. Special tests of boxes were needed to supplement the strength tests of wood as a material. Fortunately methods and special testing equipment had been developed before the war. In some specifications which involve the construction of hundreds of thousands of boxes the number of woods permitted was increased from 1 to 30. It became possible to use the woods at hand and to make full use of the facilities of box making plants wherever they might be. In addition, nailing, strapping, and construction in general were standardized and adapted to the very severe war requirements in overseas shipments. Redesigns saved enormous quantities of cargo space. Large sums were saved in initial costs. Losses since July 1 at ports of arrival in France are reported officially to be only 15 per cent of those before July 1, and the reduction is due in part to the application of Service investigations.

Another general class of problems of first importance dealt with timber supplies and production. A general survey was made of the timber resources of the United States in order to make sure that our supplies of woods should not be dangerously reduced before provision could be made for substitutes. The best data available were maintained on requirements as compared with current production, and similar data were secured concerning the forest resources of other countries. For special woods and for special purposes, much more intensive studies were required. It was not sufficient to be able to furnish data on the properties, conditioning, and uses of wood in airplanes. If it became necessary to select substitutes for spruce knowledge as to supplies, quality, current production, and the extent to which production could be increased was necessary on those woods which from the standpoint of properties alone seemed to meet requirements. The program on airplane woods included field studies of the eastern spruce, practically equivalent to the Sitka spruce of the Northwest, and also such other possible substitutes as Port Orford cedar, Douglas fir, eastern white pine, Norway pine, western white pine, yellow poplar, western hemlock, silver, noble, white, and lowland fir, and even sugar pine, cypress, redwood, and western yellow pine. The work on eastern spruce was being followed up intensively by the Navy, but work on many of the other species was far in advance of immediate requirements.

Black walnut is the accepted gunstock wood. It had been cut heavily for years, production was not meeting requirements. It became necessary, therefore, in co-operation with the States and other forestry agencies and the Boy Scouts to make a field survey throughout practically its entire range. New sources of supply were found, new producers were interested, and processes of manufacture inspected and supervised to insure the most efficient cutting of the material; for it must be remembered that the black walnut was almost equally needed for airplane propellers. Fortunately, the requirements for these two purposes could be reconciled. Production was more than doubled; and the supply of black walnut was no longer a critical problem when the armistice was signed. Two or three years more of war might, however, have required the use of substitutes.

Demand for tonnage in the transportation of food, munitions, and armies left none for the import of tannin on which we have hitherto depended. It became necessary to increase our domestic production, and as a basis for this a field survey made by the Forest Service indicated necessary lines of action for individual plants throughout practically the entire region of tannin production.

The campaign of many agencies for increased production of wood as a fuel to relieve the coal shortage is not new to readers of AMERICAN FORESTRY. The increase in production is known to be large; and it has relieved discomfort and suffering and helped to keep up the fighting spirit at home.

Many other lines of work can only be mentioned in an article of this length. Various economic questions relating to lumber, pulp, and other important forest and wood-using industries were studied in order to keep in touch with developments in the industries, to anticipate difficulties, and to provide Government organizations with the information which they might need for administrative action. Badly needed materials, such as a satisfactory coating for airplane propellers and waterproof glues primarily for plywood, were developed, as were also methods of inspection and certification for glues in general. Material assistance was given in the technical training of men, for which always the demand far exceeded the supply.

The lessons of the war will become more and more clear as time goes on. But it is already obvious that the nation without timber is handicapped in war as it is in peace. It is hardly possible that another war will find Great Britain practically without forests, and the lesson holds true everywhere. How greatly, for example, would it have been to the advantage of England, and incidentally to us as well, to have had on her own soil ample supplies of airplane spruce. England will now have another powerful incentive to go into the business of forestry. Obvious would have been the advantages to the United States to have had at home ample supplies of materials known to be suitable for airplane propellers rather than to be dependent, even in part, upon the tropics of Africa, Central America, and Asia.

Local as well as general timber supplies are necessary. In the congestion of our railroads almost the first commodity to suffer was wood. The farm woodlot has assumed a greater importance than ever before. It supplied material for many essential war needs. Black walnut brought as high as $135 per thousand feet in the tree, locust for treenails $10 per cord in the tree, and it is to be hoped that these and other wood prices have helped to make owners of woodlots realize that in the production of timber there is an opportunity for profit and service as well.

We ought to know much more definitely what our own forest resources are. In years past there have been many estimates varying in character and intensity and giving results not at all comparable. The time has now come when much more complete data under comparable plans should be secured for the entire country. It is needed in all the forest and wood-using industries as a proper basis for future plans governing their operations. It is needed to stabilize the forest industries in general. It should carry with it the collection of other data on cut-over lands, growth under present conditions and the possibilities of growth, social and labor questions, and in fact the whole range of questions necessary for the formulation of a forest policy for the Federal Government as well as for the States and private interests. We need far more knowledge as to foreign supplies, together with information as to properties and utilization and the economic and trade conditions which influence production and importation.

The war has emphasized over and over again the need for research in all lines of human endeavor. That the lesson is being heeded is shown by such great national research movements as those under way in England. With the need ahead for growing all the timber that we use, as it must be now in much of Europe, rather than depend upon virgin supplies, the technical basis must be supplied through forest research. There will undoubtedly be a vastly increased program of industrial research in the United States, and this program should include the whole range of investigations covering the properties and utilization of forest products. Industries, certainly for their profits and possibly in some cases almost for their existence, will be dependent upon the investigative efforts which they make for themselves or those which are made for them by other agencies and the results of which they apply. Investigations to determine the properties of materials and the best methods for their manufacture and use are going to have a very decided bearing on the extent to which these materials hold their place in after-the-war competition. No industry can count on holding for its products any field which it has formerly occupied. This holds true of wood and the forest and wood-using industries as much as any others. It is going to be a question of competition all along the line, beginning with the use of land, then between materials and industries in our own country, and finally, as a part of the struggle friendly or otherwise, with other nations.

AMERICAN LUMBER FOR NORWAY

THE first shipment of American house-building materials, ever sent to the wood-producing nation of Norway has just recently gone forward, according to an announcement from the Bureau of Foreign and Domestic Commerce. It is declared that the shipment is the beginning of a lumber trade which promises to develop to important dimensions.

A New York correspondent of the Bureau reports a recent trip to Louisiana where he purchased about 120,000 feet of yellow pine in the different dimensions suitable for wooden buildings, and says that the shipment was made direct to Norway from New Orleans. Another order half the size quickly followed.

The correspondent also tells of having placed orders for high-class carved interiors in quartered oak, mahogany and satinwood for homes to be erected in Christiana, as samples of American lumber building materials. Stocks of such materials are to be carried at Christiana, Bergen and Trondhjem by a company now in process of organization.

Turn Stump Land Into Money

Clear your stump land cheaply—no digging, no expense for teams and powder. One man with a K can rip out any stump that can be pulled with the best inch steel cable.

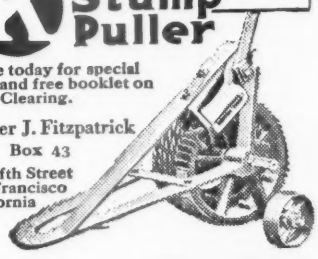
Works by leverage—same principle as a jack. 100 pound pull on the lever gives a 48-ton pull on the stump. Made of the finest steel—guaranteed against breakage. Endorsed by U. S. Government experts.

Showing easy lever operation

HAND POWER **K Stump Puller**

Write today for special offer and free booklet on Land Clearing.

Walter J. Fitzpatrick
Box 43
182 Fifth Street
San Francisco
California



No Stump Too Big

PATRONIZE OUR ADVERTISERS

WHAT "THEY SAY"

"AMERICAN FORESTRY with its unexcelled illustrations has always appealed to me and it surely is something which every forestry student should look over each month."—*J. Nelson Spaeth.*

"I shall stay with you as long as I can. Your magazine is O. K. and my wife enjoys it as much as I do. We are keeping them all for future reference."—*Pat Whelan.*

"The January number of AMERICAN FORESTRY is before me and as a devout lover of the great-outdoors, and especially the trees, I want to add my bit of praise to this most interesting issue. The appearance of the paper, the interesting articles and above all the beautiful and luring pictures are indeed worthy of commendation."—*C. E. Davidson, Editor Dealer's Bulletin.*

"Permit me to offer my hearty congratulations on the Feburary number of AMERICAN FORESTRY. The cover is attractive and the contents are so varied that every one who has a spark of love for outdoors can find something worth while that is of special interest to him. You are setting a fast pace for yourself if the magazine is to continue to improve as it has in the past. Go to it, and the best of luck."—*Joseph W. Tatum.*

"Just a line to let you know that in my estimation, you are making a wonderfully fine magazine. It is getting more attractive and valuable each month, and I am sure for you it must be a thing of beauty and a joy forever."—*D. E. Beasley.*

"I want to express my particular delight in the February AMERICAN FORESTRY which has just come to my desk. You surely have succeeded in making a readable magazine."—*J. Horace McFarland.*

"I have had in mind to write you for some days past, inquiring about Glacier National Park, and incidentally to compliment you on the AMERICAN FORESTRY. I think it fine."—*C. A. Lightner.*

"I wish to comment on the unusually interesting and instructive character of the magazine, which the present management has developed to a point of unusual excellence."—*Henry Crofut White.*

"The Monthly Lists of Current Literature, published regularly in the last pages of AMERICAN FORESTRY, are of great value to our School. Your magazine, through its popular articles, continues to be a vital factor in forest economics."—*George W. Perry.*

PLANT MEMORIAL TREES FOR OUR HEROIC DEAD

SPECIAL OFFER TO MEMBERS ONLY

One of the following described books will be presented free of charge to any member of the American Forestry Association who secures ONE NEW subscribing member:

No. 1—Field Book of American Trees and Shrubs, 465 pages, 275 illustrations of trees, leaves, blossoms, fruits, seeds, area of growth, etc.

No. 2—Field Book of Wild Birds and Their Music, 262 pages, 38 colored and 15 other full-page illustrations.

No. 3—Field Book of American Wild Flowers, 587 pages, 24 colored plates and 215 full-page illustrations.

FILL OUT THIS BLANK

I present for Subscribing Membership in the
including American Forestry Magazine, and enclose $3.00 for the 1919 fee—

Name.....

Address.....City .....

Send Book No. [ ] to Name.....

Address.....City .....

$2.00 of above fee is for AMERICAN FORESTRY for One Year.

AMERICAN FORESTRY is published monthly by the American Forestry Association.
Subscription price without membership, three dollars per year; single copies, twenty-five cents.

Please mention American Forestry Magazine when writing advertisers

CANADIAN DEPARTMENT

BY ELLWOOD WILSON

PRESIDENT, CANADIAN SOCIETY OF FOREST ENGINEERS

On January 29, 30 and 31 were held in Montreal the most interesting and best attended Forestry, Lumbering and Pulp and Paper meetings ever held in Canada and it is doubtful if any such get-together meetings of foresters and lumber and paper men were ever held before on this continent. The papers and discussion were all of a most practical nature and showed a strong spirit and desire for co-operation.

The meeting of the Canadian Forestry Association showed that body to be in a most flourishing condition, with nearly one thousand new members and a record of much useful work for the past year. Addresses were made by Major Barrington Moore, of the United States Forest Service on the work of the American Forestry Units in France and by F. J. Campbell, President of the Canadian Pulp and Paper Association, and W. Gerrard Power, President of the Canadian Lumbermen's Association. The only new officers elected were Clyde Leavitt, Forester of the Commission of Conservation, as Vice-President, and P. B. Wilson, of the Spanish River Pulp and Paper Company, as a Director.

The attendance at the meeting of the Canadian Society of Forest Engineers was the largest since the founding of the Society. The guests were, Major Barrington Moore, F. J. Campbell, Prof. Macarthy, of Syracuse University; W. G. Howard, New York Commission of Conservation; H. R. Bristol, Forester of the Delaware & Hudson Railroad; D. A. Crocker and Mr. Shepard, of the Lincoln Paper Company, and Lieut. H. M. Kinghorn. After the dinner most of the evening was taken up with a discussion of the necessity for forestry research work in the woods, following a most excellent paper on the subject by Dr. C. D. Howe, of the University of Toronto, and a most interesting discussion on forestry education and training. Dr. Howe pointed out very forcibly the lack of accurate knowledge of silvicultural and ecological and biological conditions in the woods and urged that more intensive work along these lines be conducted by studies on the ground and the establishment of sample plots where continuous studies could be made.

The Forestry Conference, under the joint auspices of the Quebec Forest Protective Association and the Woodlands Section of the Canadian Pulp and Paper Association, was opened by the Hon. Minister of Lands and Forests of Quebec, Jules Allard, who said that his Government was anxious to do all in its power to forward the proper protection and utilization of the forests and their proper conservation. Brig.-General J. B. White, D. S. O., who has been in command of the Forestry Corps in France, gave a very interesting talk on his work and on forestry conditions in France and said most forcefully that Canada must begin planting operations at once and advocated the use of returned soldiers for this work. Prof. J. M. Swaine, of the Dominion Bureau of Entomology, read an interesting paper on insect damage to the forests. Prof. Swain has spent several years in field work in the forests from the Atlantic to the Pacific and has done much work of a practical nature. His work shows that now the danger to the forests from insects is greater than that from fire and advocates more careful protective measures, chief of which is the burning of logging debris. He said that the balsam fir was so infested with fungous disease at present and so liable to attacks from borers that it was probably only a question of time before this species would be practically wiped out in Eastern Canada. Mr. Clyde Leavitt read a paper on burning logging debris from the standpoint of fire protection and logging and there were some very interesting discussions in which many practical woods operators took part. A committee of heads of Woodlands Departments was appointed to go thoroughly into the matter and to make actual experiments in burning logging debris under actual operating conditions and to report on the cost and feasibility. Dr. Fiske, of the Life Extension Institute of New York, read a paper on Health in Relation to Business. Lieut. Lewis gave a most interesting talk on the interpretation of airial photographs, illustrated by actual photos taken at the front. He showed the wonderful possibilities of such photography for making timber reconnaissances, mapping unexplored and difficult country and following the process of logging operations. There is no doubt but that in a short time the airplane will be widely used for these and other purposes. The committees on hardwood utilization and improvement of logging conditions reported and the reports brought out most interesting and practical discussion. The latter committee was continued with instructions to go into the woods and report on as many actual logging operations as possible. Demonstrations of caterpillar tractors and a new, horse-drawn, motor-operated rotary snow-plow were given.

The papers and discussion at the meetings and the discussion carried on informally by the men present seemed to bring out the following conclusions. That the present great need is for some protection against insects and fungi in the forests. That logging methods will have to be improved in order to cut down their cost and to leave the forests in better condition for a second crop. That the present method of cutting to a diameter limit is bad for the forest. That some means must be found to utilize the hardwood from mixed hardwood-softwood forests and that planting on a large scale must begin at once.

The meetings of the Technical Section of the Canadian Pulp and Paper Association and its general meeting were very interesting and largely attended and the latter brought out also the need for forest planting and the recommendation to employ returned soldiers in such work.

The Minister of Lands and Forests of Quebec has offered to contribute to the expense of a sea-plane patrol of timber limits to try out this method and see practically how it will work for fire-protection and for making maps. He has also asked the Quebec Limit Holder's Association to send a delegation to see him to discuss a law to be introduced at the 1920 session of the legislature to encourage forest planting. Such a law has been drawn up by a committee of the Association and was submitted to the Minister on the twelfth of February.

Mr. Piche, Chief Forester of Quebec, has written that he met Mr. Ridsdale, Executive Secretary of the American Forestry Association, in France and that they are both working to help reforestation in that country. He also says that everyone in Paris is talking English and that the "poilus" are making English "communiques" to their English and American comrades-in-arms.

H. M. MacMillan, who has been assistant to Major Austin Taylor, in the splendid work of the Imperial Munitions Board in getting out airplane spruce in British Columbia, will soon finish with that work. MacMillan's record as Chief Forester of British Columbia, as Canadian Trade Commissioner to the Far East and in the Spruce Production Division has been one of which he may well be very proud.

R. D. Craig, another forester, also did good work in charge of the Spruce Inspection.

The Riordon Pulp and Paper Company have agreed to continue their contribution to the co-operative investigative work being carried out by the Commission of Conservation under the direction of Dr. Howe.

The St. Maurice Paper Company of Three Rivers, Quebec, have commenced mapping and estimating their timberlands. The work is being carried out by Mr. Galarneau, chief forester, assisted by Messrs. Nix and Terry.

The Hon. A. E. Smith, Minister of Lands of the Province of New Brunswick, gave a most interesting talk on his work in putting the administration of New Brunswick's forests on a sound and scientific basis and in taking it out of politics. He made the statement that after their survey and estimate was completed that if he found it necessary to curtail the cut in that Province for the sake of perpetuating the forests that he would certainly do it. New Brunswick and Quebec are running a neck and neck race in the work of putting their forestry administration on a sound and enduring basis.

It looks as if it was "up to" Ontario to make a move for the placing of its timber sales branch under the direction of the forestry branch and to begin a survey of its forest resources.

The Timberman, in its January issue, describes a method in use in Sweden by which branch wood and other wood up to four inches in diameter is cut up by a machine into pieces and burnt like coal. This proved very successful where too deep a layer was not placed on the grate and shows a way in which much wood now wasted could be utilized.

Orchids We are specialists in Orchids; we collect, import, grow, sell and export this class of plants exclusively.
Our illustrated and descriptive catalogue of Orchids may be had on application. Also special list of freshly imported unestablished Orchids.
LAGER & HURRELL
Orchid Growers and Importers SUMMIT, N. J.

PLANT MEMORIAL TREES FOR OUR SOLDIERS AND SAILORS

WHEN planting Memorial trees, why not plant a tree which will beautify the landscape and in a few years furnish a lucrative income? Hardy Pomeroy English Walnut Trees will do this.
Booklet Free.
D. N. POMEROY & SON
English Walnut Orchards
LOCKPORT, N. Y.

The Bartlett Way
If You Own Trees You Need This Book
"Tree Health" is its name. An invaluable handbook on care of trees, that is ALIVE with practical, helpful hints.
Tells how The Bartlett Way of Tree Surgery differs from "other ways."
Why better. Send for it.
THE F. A. BARTLETT CO. 544 MAIN STREET STAMFORD, CONN.

EVERYTHING for the GARDEN
is the title of our 1919 catalogue—one of the most beautiful and complete horticultural publications of the year—really a book of 184 pages, 8 colored plates and over 1000 photo-engravings, showing actual results without exaggeration. It is a mine of information of everything in Gardening, either for pleasure or profit, and embodies the result of over seventy-two years of practical experience. To give this catalogue the largest possible distribution we make the following unusual offer:
To every one who will state where this advertisement was
Every Empty Envelope Counts As Cash
to every one who will state where this advertisement was seen and who encloses 10 cents we will mail the catalogue
And Also Send Free Of Charge
Our Famous "HENDERSON" COLLECTION OF SEEDS
containing one pack each of Ponderosa Tomato, Big Boston Lettuce, White Tipped Scarlet Radish, Henderson's Invincible Asters, Henderson's Brilliant Mixture Poppies and Giant Waved Spencer Sweet Peas, in a coupon envelope, which when emptied and returned will be accepted as a 25-cent cash payment on any order amounting to $1.00 and upward.
PETER HENDERSON & CO. 35 & 37 CORTLANDT ST. NEW YORK CITY

ADVISORY BOARD

Representing Organizations Affiliated with the American Forestry Association

National Wholesale Lumber Dealers' Association
W. CLYDE SYKES, Conifer, N. Y.
R. L. SISSON, Potsdam, N. Y.
JOHN M. WOODS, Boston, Mass.

Northern Pine Manufacturers' Association
C. A. SMITH, Coos Bay, Ore.
WILLIAM IRVINE, Chippewa Falls, Wis.
F. E. WEYERHAEUSER, St. Paul, Minn.

North Carolina Forestry Association
E. B. WRIGHT, Boardman, N. C.
HUGH MacRAE, Wilmington, N. C.
J. C. SMOOT, North Wilkesboro, N. C.

National Association of Box Manufacturers
B. W. PORTER, Greenfield, Mass.
S. B. ANDERSON, Memphis, Tenn.
ROBT. A. JOHNSON, Minneapolis, Minn.

Carriage Builders' National Association
H. C. McLEAR, Wilmington, Del.
D. T. WILSON, New York.
C. A. LANCASTER, South Bend, Ind.

Boston Paper Trade Association
N. M. JONES, Lincoln, Maine.
JOHN E. A. HUSSEY, Boston, Mass.
ARTHUR L. HOBSON, Boston, Mass.

Philadelphia Wholesale Lumber Dealers' Ass'n
J. RANDALL WILLIAMS, JR., Philadelphia, Pa.
FRED'K S. UNDERHILL, Philadelphia, Pa.

New Hampshire Timberland Owners' Association
W. H. BUNDY, Boston, Mass.
EVERETT E. AMEY, Portland, Me.
F. H. BILLARD, Berlin, N. H.

Massachusetts Forestry Association
NATHANIEL T. KIDDER, Milton, Mass.
FREDERIC J. CAULKINS, Boston, Mass.
HARRIS A. REYNOLDS, Cambridge, Mass.

Lumbermen's Exchange
J. RANDALL WILLIAMS, JR., Philadelphia, Pa.
FREDERICK S. UNDERHILL, Philadelphia, Pa.
R. B. RAYNER, Philadelphia, Pa.

Camp Fire Club of America
WILLIAM B. GREELEY, Washington, D. C.
O. H. VAN NORDEN, New York
FREDERICK K. VREELAND, New York

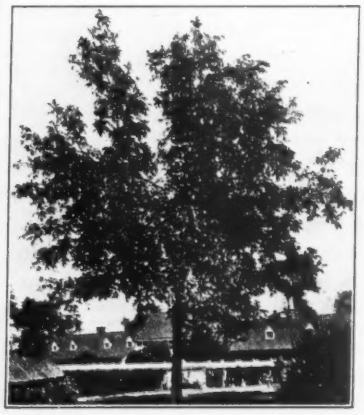
Empire State Forest Products Association
FERRIS J. MEIGS, New York City
RUFUS L. SISSON, Potsdam, N. Y.
W. L. SYKES, Utica, N. Y.

California Forest Protective Association
MILES STANDISH, San Francisco, Cal.
GEO. X. WENDLING, San Francisco, Cal.
GEO. H. RHODES, San Francisco, Cal.

Minnesota Forestry Association
W. T. COX, St. Paul, Minn.
PROF. D. LANGE, St. Paul, Minn.
MRS. CARRIE BACKUS, St. Paul, Minn

American Wood Preservers' Association
M. K. TRUMBULL, Kansas City, Mo.
A. R. JOYCE, Chicago, Ill.
F. J. ANGIER, Baltimore, Md.

Southern Pine Association
J. B. WHITE, Kansas City, Mo.
J. E. RHODES, New Orleans, La.
HENRY E. HARDTNER, Uranie, La.



A Beautiful English Walnut Tree in Washington's Garden, Mt. Vernon.

The Great Washington

probably did not know that an acre (50 trees) of

English Walnut Trees

will produce in a single year food equal to 60,000 eggs (as asserted by Dr. J. H. Kellog), but he did know the great value of nut trees and planted them around his home at Mt. Vernon. *You* may not know that at Rochester we have highly developed the

Northern Grown English Walnut Tree

so that it is available for planting about your home, in your garden and orchard, with the same assurance of success as a planting of Apples, Pears and Peaches, without regard to our cold winters.

Read about these wonderful trees in our 1919 **catalogue,** which will be sent **free on request,** and let us aid you in making a selection for your home, in your garden and orchard, with

GLEN BROS., Inc., Glenwood Nursery,
1827 Main St., Rochester, N. Y.

A Modern English Walnut Orchard near Rochester, N. Y.
260 bushels from 228 trees—one season

Nursery Stock for Forest Planting

TREE SEEDS

SEEDLINGS *Write for prices on large quantities* **TRANSPLANTS**

THE NORTH-EASTERN FORESTRY CO.
CHESHIRE, CONN.

TREES *for*

FOREST PLANTING

Plant forest trees. Give employment to our returning soldiers and supply timber for future needs.

We have the trees and will have the men to plant them.

Give us your order now for next Spring.

KEENE FORESTRY ASSOCIATION

KEENE, N. H.

We will plant our trees by contract or at cost to us.

FISKE FENCE

Climb proof chain link fencing, wrought iron and woven iron fence, iron gates, lamp standards, grille work fountains, vases, tennis court and poultry yard enclosures, stable fittings.

Catalogue on request.

J. W. FISKE IRON WORKS
100-102 Park Place **New York City**
45

WE HAVE THEM
--YOU--
MAY NEED THEM

500,000 Oak Seedlings in Ten Sorts

Elm, Ash, Catalpa, Butternut, Hickory, Locust and other Seedlings. 1,000,000 Resinosa, Rigida, Thunbergii, Ponderosa and Strobus pines.

A full supply of shrubs in lining out sizes and specimen plants for immediate effect.

Send for list and Prices Today

ATLANTIC NURSERY CO.
Incorporated
BERLIN, MD. - - U. S. A.

NATIONAL FORESTS FURNISH RECREATION WORTH MILLIONS

LAST year the National Forests provided $7,500,000 worth of recreation to the people of the United States, according to a statement of Landscape Architect Frank A. Waugh in his publication "Recreation Uses on the National Forests," just issued by the United States Department of Agriculture.

The Government charges no admission fee to these great recreation grounds, containing some of the finest hunting, fishing and camping places in the world; but if citizens had paid the minimum price demanded for wholesome recreation by commercial dealers in that commodity, and willingly paid by the public, the total would have reached the above amount. More than 3,000,000 people spent on the average not less than 25 hours in the Forests, so that the number of hours of recreation was at least 75,000,000. A valuation of 10 cents an hour equals the cost of a cheap movie. But the charge to the public for hunting or fishing, for visiting the wonders of the National Monuments, for access to some of the finest scenery in the world for automobiling and picnicing was nothing—a low price to pay for $7,500,000 worth of recreation.

The recreational value of the National Forests alone is estimated by Dr. Waugh as more than the whole cost of their administration, and is in addition to the timber and forage resources and the value of watershed protection. On this basis the National Forests are certainly a paying investment for the American people.

WOODLOT MAY INSURE SAFE WATER

ON ANY farm a woodlot, grove, or windbreak is highly desirable, not only to supply fuel and small timber, but for its beauty and the protection it affords. If kept clean and free from stock, such wooded area, an orchard even, may be made to serve another useful purpose, that of supplying water, says Farmers' Bulletin 941, "Water System for Farm Homes." Forest-covered lands conserve rainfall and soil moisture, and in many instances afford ideal sources for farm water supplies. The farmer therefore, who fences off his wood lot, or part of it, or forests an inclosed area and keeps it clean for water-supply purposes, is following closely the wise policy of cities and towns which, to insure safe, ample water supplies, acquire elevated, sparsely settled watersheds, and clean, forest, and patrol them.

WHEN MEMORIAL TREES ARE PLANTED PLEASE INFORM THE AMERICAN FORESTRY ASSOCIATION, WASHINGTON, D. C.

CURRENT LITERATURE

MONTHLY LIST FOR FEBRUARY, 1919

(Books and periodicals indexed in the library of the United States Forest Service.)

FORESTRY AS A WHOLE

Proceedings and reports of associations, forest officers, etc.

Hawaiian sugar planters' association. Report of the committee on forestry for the year ending Sept. 30, 1918. 14 p. Honolulu, 1918.

India—Forest dept. Annual return of statistics relating to forest administration for the year 1916-17. 24 p. diagr. Simla, 1918.

South Australia—Woods and forests dept. Annual progress report upon state forest administration for the year 1917-18. 13 p. pl. Adelaide, 1918.

Sweden—Forstliche versuchsanstalt. Mitteilungen, 13.-14. heft, 1916-17, v. 1-2. il. Stockholm, 1917.

SILVICULTURE

Buhler, Anton. Der waldbau, v. 1. 662 p. Stuttgart, E. Ulmer, 1918.

FOREST PROTECTION

Insects

Great Britain—Board of agriculture and fisheries. Insect and fungus pests of basket willows. 11 p. pl. London, 1918. (Leaflet no. 301.)

Diseases

Cheel, E. and Cleland, J. B. Disease in forest trees caused by the larger fungi. 12 p. pl. Sydney, 1918. (New South Wales—Forestry commission. Bulletin no. 12.)

Rankin, W. H. Manual of tree diseases. 398 p. il. N. Y., The Macmillan Co., 1918.

Fire

Coeur d'Alene timber protective association. Thirteenth annual report, 1918. 12 p. Coeur d'Alene, Idaho, 1918.

Maine—Dept. of state lands and forestry. Fire protection, Maine forestry district. 72 p. Bingham, Me., 1918. (Bulletin no. 2.)

FOREST MANAGEMENT

Nova Scotia—Dept. of crown lands. The farm woodlot in Nova Scotia. 23 p. il. Halifax, 1917.

FOREST ADMINISTRATION

New York—Conservation commission. Circular of information relating to lands and forests. 32 p. il. Albany, 1918.

U. S.—Dept. of agriculture—Forest service. January field program, 1919. 31 p. Wash., D. C., 1919.

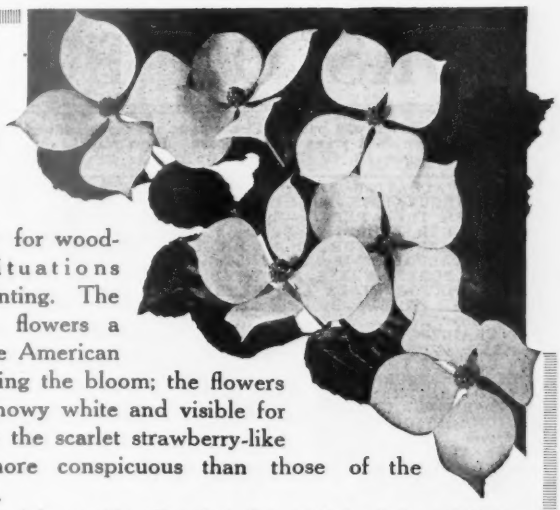
U. S.—Dept. of agriculture—Forest service. What the national forests mean to the water user, by S. T. Dana. 52 p. il., map. Wash., D. C., 1919.

FOREST UTILIZATION

Central bureau of planting and statistics—Statistical clearing house. A list of forest products statistics. 53 p. Wash., D. C., 1918.

Japanese Dogwood

Cornus Kousa



Specially valuable for woodlands and other situations adapted to mass planting. The Japanese Dogwood flowers a month later than the American species, thus extending the bloom; the flowers are much larger, snowy white and visible for half a mile or more; the scarlet strawberry-like fruits are much more conspicuous than those of the American Dogwood.

We offer a large quantity of 2-year old seedling plants 8 to 12 inches high, at $8.00 per 100, or $35.00 per 500.

Our catalogues and booklets will be of special value to those who contemplate extensive plantings of deciduous trees and shrubs, or evergreens. Write today for copies.

HICKS NURSERIES, BOX F, WESTBURY, N. Y.

FORESTRY SEEDS

I OFFER AT SPECIAL PRICES

Pinus Strobus	Picea Englemanni
Pseudo-tsuga Douglassi	Picea Pungens
Pinus Ponderosa	Thuya Occidentalis
	Pinus Taeda

and many other varieties, all of this season's crop and of good quality. Samples upon request. Send for my catalogue containing full list of varieties.

THOMAS J. LANE

TREE SEEDSMAN

Dresher Pennsylvania

HILL'S
Seedlings and Transplants

ALSO TREE SEEDS FOR REFORESTING

BEST for over half a century. All leading hardy sorts, grown in immense quantities. Prices lowest. Quality highest. Forest Planter's Guide, also price lists are free. Write today and mention this magazine.

THE D. HILL NURSERY CO.

Evergreen Specialists
Largest Growers in America

BOX 501 DUNDEE, ILL.

For Living Memorials Plant Rosedale Trees

¶ The best memorials are Evergreen Trees, symbolic of Immortality.

¶ Rosedale Evergreens have been frequently transplanted and carefully grown. They have developed sturdy tops and compact root systems that thrive when removed to new surroundings. We offer you a choice among 70 varieties. The large sizes can be safely transplanted for immediate effect.

¶ We also supply nursery trees, both Evergreen and Deciduous, in large quantities for forestry planting.

Write today for the Rosedale Catalog.

ROSEDALE NURSERIES
S. G. Harris, Proprietor
Box K Tarrytown, N. Y.

BOOKS ON FORESTRY

AMERICAN FORESTRY will publish each month, for the benefit of those who wish books on forestry, a list of titles, authors and prices of such books. These may be ordered through the American Forestry Association, Washington, D. C. Prices are by mail or express prepaid.

FOREST VALUATION—Filibert Roth	$1.50
FOREST REGULATION—Filibert Roth	2.00
PRACTICAL TREE REPAIR—By Elbert Peets	2.00
THE LUMBER INDUSTRY—By R. S. Kellogg	1.10
LUMBER MANUFACTURING ACCOUNTS—By Arthur F. Jones	2.10
FOREST VALUATION—By H. H. Chapman	2.00
CHINESE FOREST TREES AND TIMBER SUPPLY—By Norman Shaw	2.50
TREES, SHRUBS, VINES AND HERBACEOUS PERENNIALS—By John Kirkegaard	1.50
TREES AND SHRUBS—By Charles Sprague Sargent—Vols. I and II, 4 Parts to a Volume—Per Part	5.00
THE TRAINING OF A FORESTER—Gifford Pinchot	1.35
LUMBER AND ITS USES—R. S. Kellogg	1.15
THE CARE OF TREES IN LAWN, STREET AND PARK—B. E. Fernow	2.17
NORTH AMERICAN TREES—N. L. Britton	7.30
KEY TO THE TREES—Collins and Preston	1.50
THE FARM WOODLOT—E. G. Cheyney and J. P. Wentling	1.75
IDENTIFICATION OF THE ECONOMIC WOODS OF THE UNITED STATES—Samuel J. Record	1.25
PLANE SURVEYING—John C. Tracy	3.00
FOREST MENSURATION—Henry Solon Graves	4.00
THE ECONOMICS OF FORESTRY—B. E. Fernow	1.61
FIRST BOOK OF FORESTRY—Filibert Roth	1.10
PRACTICAL FORESTRY—A. S. Fuller	1.50
PRINCIPLES OF AMERICAN FORESTRY—Samuel B. Green	1.50
TREES IN WINTER—A. S. Blakeslee and C. D. Jarvis	2.00
MANUAL OF THE TREES OF NORTH AMERICA (exclusive of Mexico)—Chas. Sprague Sargent	6.00
AMERICAN WOODS—Romeyn B. Hough, 14 Volumes, per Volume	7.50
HANDBOOK OF THE TREES OF THE NORTHERN U. S. AND CANADA, EAST OF THE ROCKY MOUNTAINS—Romeyn B. Hough	6.00
GETTING ACQUAINTED WITH THE TREES—J. Horace McFarland	1.75
PRINCIPAL SPECIES OF WOOD; THEIR CHARACTERISTIC PROPERTIES—Chas. H. Snow	3.50
HANDBOOK OF TIMBER PRESERVATION—Samuel M. Rowe	5.00
TREES OF NEW ENGLAND—L. L. Dame and Henry Brooks	1.50
TREES, SHRUBS AND VINES OF THE NORTHEASTERN UNITED STATES—H. E. Parkhurst	1.50
TREES—H. Marshall Ward	1.50
OUR NATIONAL PARKS—John Muir	1.91
LOGGING—Ralph C. Bryant	3.50
THE IMPORTANT TIMBER TREES OF THE UNITED STATES—S. B. Elliott	2.50
FORESTRY IN NEW ENGLAND—Ralph C. Hawley and Austin F. Hawes	3.50
THE PRINCIPLES OF HANDLING WOODLANDS—Henry Solon Graves	1.50
SHADE TREES IN TOWNS AND CITIES—William Solotaroff	3.00
THE TREE GUIDE—By Julia Ellen Rogers	1.00
MANUAL FOR NORTHERN WOODSMEN—Austin Cary	2.12
FARM FORESTRY—Alfred Akerman	.57
THE THEORY AND PRACTICE OF WORKING PLANS (in forest organization)—A. B. Recknagel	2.10
ELEMENTS OF FORESTRY—F. F. Moon and N. C. Brown	2.20
MECHANICAL PROPERTIES OF WOOD—Samuel J. Record	1.75
STUDIES OF TREES—J. J. Levison	1.75
TREE PRUNING—A. Des Cars	.65
THE PRESERVATION OF STRUCTURAL TIMBER—Howard F. Weiss	3.00
SEEDING AND PLANTING IN THE PRACTICE OF FORESTRY—By James W. Toumey	3.50
FUTURE OF FOREST TREES—By Dr. Harold Unwin	2.25
FIELD BOOK OF AMERICAN TREES AND SHRUBS—F. Schuyler Mathews, $2.00 (in full leather)	3.00
FARM FORESTRY—By John Arden Ferguson	1.30
THE BOOK OF FORESTRY—By Frederick F. Moon	2.10
OUR FIELD AND FOREST TREES—By Maud Going	1.50
HANDBOOK FOR RANGERS AND WOODSMEN—By Jay L. B. Taylor	2.50
THE LAND WE LIVE IN—By Overton Price	1.70
WOOD AND FOREST—By William Noyes	3.00
THE ESSENTIALS OF AMERICAN TIMBER LAW—By J. P. Kinney	3.00
HANDBOOK OF CLEARING AND GRUBBING, METHODS AND COST—By Halbert P. Gillette	2.50
FRENCH FORESTS AND FORESTRY—By Theodore S. Woolsey, Jr.	2.50
MANUAL OF POISONOUS PLANTS—By L. H. Pammel	5.35
WOOD AND OTHER ORGANIC STRUCTURAL MATERIALS—Chas. H. Snow	5.00
EXERCISES IN FOREST MENSURATION—Winkenwerder and Clark	1.50
OUR NATIONAL FORESTS—H. D. Boerker	2.50
MANUAL OF TREE DISEASES—Howard Rankin	2.50
FRANCE, THE FRANCE I LOVE—By Dr. Du Bois Loux, Pauline L. Diver, New York City	1.50

*** This, of course, is not a complete list, but we shall be glad to add to it any books on forestry or related subjects upon request.—EDITOR.**

POSITIONS WANTED

POSITION wanted by technically trained Forester. Have had fourteen years experience along forestry lines, over five years on the National Forests in timber sale, silvicultural and administrative work; three years experience in city forestry, tree surgery and landscape work. Forester for the North Shore Park District of Chicago. City forestry and landscape work preferred, but will be glad to consider other lines. Can furnish the best of reference. Address Box 600, Care American Forestry Magazine, Washington, D. C. (1-3)

YOUNG MAN recently discharged from the U. S. Navy, wants employment with wholesale lumber manufacturer; college graduate; five year's experience in nursery business; can furnish best of references. Address Box 675, Care American Forestry Magazine, Washington, D. C. (1-3)

FOREST ENGINEER, 30 years of age; married; eight (8) years experience in South and Northeast, in field and administration, desires to make a change. References upon request. Address Box No. 510 Care American Forestry Magazine, Washington, D. C.

OUR ADVERTISERS ARE RELIABLE

Wood-using industries

Smith, F. H. Pulpwood consumption and wood-pulp production in 1917. 19 p. Wash., D. C., 1919. (U. S.—Dept. of agriculture. Bulletin 758.)

Strachan, J. The recovery and remanufacture of waste paper; a practical treatise. 158 p. il. Aberdeen, The Albany press, 1918.

Technical association of the pulp and paper industry. Vocational education in the pulp and paper industry. 6 p. N. Y., 1919.

Technical association of the pulp and paper industry. Year book, containing lists of members arranged alphabetically and geographically, corrected to July, 1918. 40 p. N. Y., 1918.

Talley, H. R. Machinery for cutting firewood. 16 p. il. Wash., D. C., 1919. (U. S.—Dept. of agriculture. Farmers' bulletin 1023.)

WOOD TECHNOLOGY

Western Australia—Woods and forests dept. Quelques apercus sur les bois de l'Australie occidentale. 23 p. il., map. Perth, 1918.

WOOD PRESERVATION

Kynoch, W. and Coderre, J. A. Creosote treatment of jack pine and eastern hemlock for cross-ties. 24 p. il. Ottawa, 1919. (Canada—Dept. of the interior—Forestry branch. Bulletin 67.)

AUXILIARY SUBJECTS

Conservation of natural resources

Wisconsin—State conservation commission. Biennial report for the fiscal years ending June 30, 1917, and June 30, 1918. 144 p. il. Madison, Wis., 1918.

Botany

Palladin, V. I. Plant physiology. 320 p. il. Phila., Pa. Blackiston's son & co., 1918.

Grazing

Sampson, A. W. Effect of grazing upon aspen reproduction. 29 p. pl. Wash., D. C., 1919. (U. S.—Dept. of agriculture. Bulletin 741.)

National monuments

Sieur de Monts national monument. Publication no. 22. 20 p. il. Bar Harbor, Me., 1918.

Aviation

Wright-Martin aircraft corporation. Hispano-Suiza aeronautical engines. 148 p. il., pl. New Brunswick, N. J., 1918.

PERIODICAL ARTICLES

Miscellaneous periodicals

Botanical gazette, Dec., 1918.—Limiting factors in relation to specific ranges of tolerance of forest trees, by A. H. Hutchinson, p. 465-93; Notes on North American trees: 3, Tilia, by C. S. Sargent, p. 494-511.

Bulletin of the Pan-American Union, Dec., 1918.—Fustic wood, by C. D. Mell, p. 823-32.

California fish and game, Jan., 1919.—The coyote as a deer killer, by E. V. Jotter, p. 26-29.

Conservation, Feb., 1919.—Reforestation as a post-war policy, by C. Leavitt, p. 8.

UNIVERSITY OF MAINE
ORONO, MAINE

Maintained by State and Nation

THE FORESTRY DEPARTMENT offers a four years' undergraduate curriculum, leading to the degree of Bachelor of Science in Forestry.

* * * * * * *

Opportunities for full technical training, and for specializing in problems of the Northeastern States and Canada.

* * * * * * *

John M. Briscoe,
Professor of Forestry
Carleton W. Eaton,
Associate Professor

* * * * * * *

For catalog and further information, address

ROBERT J. ALEY, Pres't,
Orono, Maine

School of Forestry
UNIVERSITY OF IDAHO

Four Year Course, with opportunity to specialize in General Forestry, Logging Engineering, and Forest Grazing.

Forest Ranger Course of high school grade, covering three years of five months each.

Special Short Course covering twelve weeks designed for those who cannot take the time for the fuller courses.

Correspondence Course in Lumber and Its Uses. No tuition, and otherwise expenses are the lowest.

For Further Particulars Address

Dean, School of Forestry
University of Idaho
Moscow, Idaho

DEPARTMENT OF FORESTRY

The Pennsylvania State College

A PROFESSIONAL course in Forestry, covering four years of college work, leading to the degree of Bachelor of Science in Forestry.

Thorough and practical training for Government, State, Municipal and private forestry.

Four months are spent in camp in the woods in forest work.

Graduates who wish to specialize along particular lines are admitted to the "graduate forest schools" as candidates for the degree of Master of Forestry on the successful completion of one year's work.

For further information address

Department of Forestry

Pennsylvania State College

State College, Pa.

Country gentleman, Jan. 25, 1919.—Tapping nature's sugar bush, by R. H. Smith, p. 13, 63-4.

Country life, Feb., 1919.—The decline of the hickory bark beetle, by H. Bird, p. 96, 98.

Gardeners' chronicle, Jan. 4, 1919.—The judas tree in London, by A. D. Webster, p. 2.

Geographical review, Dec., 1918.—A combined map and panorama for orientation from lookout stations, by E. Fritz, p. 501-3.

In the open, Jan., 1919.—Our national elk herds, by E. W. Nelson and H. S. Graves, p. 33-8.

Iowa conservation, July-Sept., 1918.—The national park of the middle west, by G. Bennett, p. 43-7.

Journal of geography, Jan., 1919.—Black walnut and the war, by S. R. Winters, p. 33-5.

National wool grower, Jan., 1919.—Use of the forests, by S. R. Winters, p. 21-2.

New Zealand journal of agriculture, Dec. 20, 1918.—The native forests and forestry matters, by E. P. Turner, p. 376-80.

Oregon voter, Jan. 4, 1919.—Wood shipbuilding, p. 76-9.

Parks and recreation, Jan., 1919.—City forestry, by J. Koening, p. 20-2; The forest preserve district of Cook co., Ill., by D. H. Perkins, p. 25-8.

Science, Dec. 27, 1918.—Resistance in the American chestnut to the bark disease, by A. H. Graves, p. 652-3.

Science, Jan. 24, 1919.—Eucalyptus never present in North America, by E. W. Berry, p. 91-2.

Scientific American, Dec., 1918.—Freeing the forest reserves from predatory animals, p. 571-2.

Scientific American supplement, Dec. 21, 1918.—The wax palm and its uses, by C. D. Mell, p. 395.

U. S. Dept. of agriculture. Journal of agricultural research, Dec. 9, 1918.—Seedling diseases of conifers, by C. Hartley and others, p. 521-58.

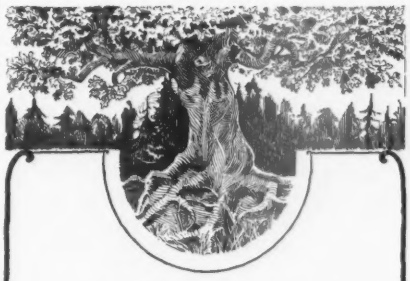
U. S. Dept. of agriculture. Journal of agricultural research, Dec. 23, 1918.—Parasitism, morphology, and cytology of Cronartium ribicola, by R. H. Colley, p. 619-60.

U. S. Dept. of agriculture. Monthly weather review, Nov., 1918.—Smoke from Minnesota forest fires, by H. Lyman, p. 506-9.

U. S. Dept. of agriculture. Weekly news letter, Feb. 5, 1919.—Carlessness causes most fires in national forests, p. 2-3.

U. S. Dept. of agriculture. Weekly news letter. Feb. 12, 1919.—Foresters advise provision for fuel wood of future, p. 3.

U. S. Dept. of agriculture. Weekly news letter, Feb. 19, 1919.—Simple treatment renders short-lived wood durable, p. 13-14.



WHEN YOU BUY
PHOTO-ENGRAVINGS

buy the right kind--That is, the particular style and finish that will best *illustrate* your thought and *print* best *where* they are to be used. Such engravings are the real *quality* engravings for *you*, whether they cost much or little.

We have a reputation for intelligently co-operating with the buyer to give him the engravings that will best suit his purpose--

Our little house organ "Etchings" is full of valuable hints--Send for it.

H. A. GATCHEL, Pres. C. A. STINSON, Vice-Pres.

GATCHEL & MANNING
PHOTO-ENGRAVERS
Sixth and Chestnut Streets
PHILADELPHIA

HARVARD UNIVERSITY

DEPT. OF FORESTRY
BUSSEY INSTITUTION

OFFERS specialized graduate training leading to the degree of Master of Forestry in the following fields: — Silviculture and Management, Wood Technology, Forest Entomology Dendrology, and (in co-operation with the Graduate School of Business Administration) the Lumber Business.

For further particulars address

RICHARD T. FISHER

Jamaica Plain, Massachusetts

The New York State College of Forestry

at
Syracuse University,
Syracuse, N. Y.

UNDER-GRADUATE courses in Technical Forestry, Paper and Pulp Making, Logging and Lumbering, City Forestry, and Forest Engineering, all leading to degree of Bachelor of Science. Special opportunities offered for post-graduate work leading to degrees of Master of Forestry, Master of City Forestry, and Doctor of Economics.

A one-year course of practical training at the State Ranger School on the College Forest of 1,800 acres at Wanakena in the Adirondacks.

State Forest Camp of three months open to any man over 16, held each summer on Cranberry Lake. Men may attend this Camp for from two weeks to the entire summer.

The State Forest Experiment Station of 90 acres at Syracuse and an excellent forest library offer unusual opportunities for research work.

Trade journals and consular reports

American lumberman, Jan. 25, 1919.—Timber cargo to be its own vessel, p. 35.

American lumberman, Feb. 1, 1919.—Damage to French forests, by T. S. Woolsey, Jr., p. 46-7; Federal rules for crosstie production, p. 47; The geared locomotive in lumbering, p. 51; Russian lumber industry demoralized, by R. E. Simmons, p. 53.

American lumberman, Feb. 8, 1919.—British timber trade during 1918, p. 71-2.

Automotive industries, Dec. 19, 1918.—Development of the aircraft spruce industry, by L. K. Hodges, p. 1037-40.

Coal age, Dec. 5, 1918.—Preservative treatment of mine timbers, by K. C. Garth, p. 1025-7.

DuPont magazine, Feb., 1919.—The destructive distillation of wood, by C. T. Clark, p. 15-18.

Engineering and contracting, Feb. 5, 1919.—Results of 12 year service tests of experimental wood block pavement at Minneapolis, p. 146-7.

Engineering news-record, Jan. 30, 1919.—Progress reported on wood block experiments in Minneapolis, by C. H. Teesdale and J. D. MacLean, p. 233-4; Rainfall influence on durability of zinc treated cross-ties, by C. H. Teesdale and S. W. Allen, p. 234-5; Non-pressure treatment of wood for buildings, p. 237-8.

Hardwood record, Jan. 25, 1919.—Woods used in making violin bows, p. 39-40; Cloth made of wood, p. 40.

Lumber, Feb. 3, 1919.—Lumber trade in Great Britain, by J. Y. Dunlop, p. 46-7.

Lumber, Feb. 10, 1919.—War service of west coast mills recounted, p. 13; Cypress conditions seen at short range, by J. E. Williams, p. 15-16; Forestry as a rural community project, by R. S. Hosmer, p. 48-50.

Lumber, Feb. 17, 1919.—Tractors revolutionize lumber operations on the Pacific coast, p. 43.

Lumber trade journal, Feb. 1, 1919.—Success of wood constructed ships, by J. O. Heyworth, p. 17; Prospects for lumber in Italy, by N. C. Brown, p. 21-2.

Lumber world review, Jan. 25, 1919.—Wooden shipbuilding on the Pacific coast, p. 19-24; Creosoted southern pine railroad tanks, p. 26-7.

Manufacturers' record, Oct. 17, 1918.—The wooden ship, by E. T. Hollingsworth, p. 74-5.

Packages, Feb., 1919.—History of pail industry, p. 32.

Paper, Jan. 29, 1919.—Paper section of the U. S. Bureau of standards, p. 11-13; Papermaking in Japan, p. 14-17.

Paper, Feb. 5, 1919.—Woodpulp manufacture in France, by P. Rochon, p. 11-15.

Paper mill, Jan. 25, 1919.—Japan's paper requirements, by F. R. Rutter, p. 16.

Paper mill, Feb. 8, 1919.—The art of papermaking, by C. T. Hamill and S. F. Acre, p. 97-8.

Paper trade journal, Jan. 13, 1919.—Utilization of eucalyptus as a raw material of paper, p. 42, 52.

Paper trade journal, Feb. 6, 1919.—Paper and pulp in France in 1918, by E. Bardet, p. 35, 39; Pulp mills in the United States, by H. E. Surface and F. H. Smith, p. 109, 111, 113, 115, 121; Pulp and paper investigations of the Forest products laboratory in 1918, by V. P. Edwardes, p. 123-4; Forest planting work of Laurentide co., ltd., by E. Wilson, p. 133, 135; Work of the U. S. paper laboratory, p. 275, 277, 279.

Pioneer western lumberman, Feb. 15, 1919.—Conserving the bark, by U. S. McMillan, p. 9.

Pulp and paper magazine, Jan. 2, 1919.—The manufacture of groundwood pulp, by G. W. Dickson, p. 3-6.

Pulp and paper magazine, Jan. 30, 1919.—Indirect cooking by forced circulation, by A. E. Nielsen, p. 105-10.

Railway age, Jan. 31, 1919.—Use of treated timber in car construction, p. 295-8.

Railway age, Feb. 7, 1919.—Tie producers discuss conditions in industry, p. 343-8.

Railway review, Feb. 15, 1919.—Comparison of methods for purchasing ties, by J. W. Fristoe, p. 242-4; Timber conservation in the tie business, p. 255-6.

Southern lumberman, Jan. 25, 1919.—Quarter-sawing in a nutshell, p. 39.

Southern lumberman, Feb. 1, 1919.—New type of wooden ship developed during the war, p. 33.

Southern lumberman, Feb. 8, 1919.—The inexhaustible supply of wood for wheels, p. 32-3.

Timber trades journal, Jan. 11, 1919.—Rafting across the Atlantic, p. 43.

Timber trades journal, Jan. 18, 1919.—Rafting in British Columbia, p. 81.

Timber trades journal, Feb. 1, 1919.—The forest wealth of Burma, by A. S. Judge, p. 184; China's trade in imported timber, p. 188.

Timberman, Jan. 1919.—British Columbia's drive for airplane spruce, p. 36-7; Australia discovering her timber resources. p. 39; Second annual red cedar shingle congress, p. 43-6; Utilization of wood in Sweden, H. Sylven, p. 81.

Timberman, Feb., 1919.—Mediterranean countries in need of lumber, by N. C. Brown, p. 35; Some wood lessons of the war, by H. B. Oakleaf, p. 36, 86-9; West coast lumber in the Brazilian markets, by E. F. Horn, p. 38-9, 67; Standardized timber bridge for logging railroads, by W. W. Amburn, p. 46; Development of lumber industry in Sweden, by H. Sylven, p. 56.

U. S. commerce report, Jan. 24, 1919.—Extracting kauri-gum oil in New Zealand, by A. A. Winslow, p. 376.

U. S. commerce report, Feb. 3, 1919.—British purchases of Canadian lumber,

by G. W. Shotts, p. 515; Lumber trade notes from Quebec, by E. V. Richardson, p. 517; Rubber from Hainan Island, by G. E. Anderson, p. 532.

U. S. commerce report, Feb. 4, 1919.—Current American shipbuilding, p. 550-1; Progress of paper textiles in U. S., by H. G. Brock, p. 556-9.

U. S. commerce report, Feb. 10, 1919.—Textile substitutes in Germany, p. 643.

Veneers, Feb., 1919.—The future of American walnut, by G. D. Crain, p. 16-17.

West coast lumberman, Feb. 1, 1919.—Remarkable story of aircraft lumber production in British Columbia, p. 21, 44; Wooden ship made splendid record during war, p. 28, 47.

Wood turning, Feb., 1919.—Getting out small dimensions, by J. F. Hobart, p. 13-15.

Wood-worker, Feb., 1919.—Wood for artificial limbs, p. 21-2; Extended use of west coast woods, p. 22; A drykiln and storage room layout, by J. B. Ross, p. 26-7.

Forest journals

American forestry, Feb., 1919.—Forests and floods in China, by H. H. Chapman, p. 835-43; The new spring saw, p. 844; Italian government buys timber, p. 844; Substitutes for hickory in the manufacture of handles, p. 844; Wood used in vehicle manufacture, by H. Maxwell, p. 845-52; Free trees for planting in Penna., p. 852; Beware the ash-wood borer, p. 852; Walks in the woods, by J. O. Swift, p. 853-5; A national park to honor Roosevelt, p. 855; The pine woods folks, by E. G. Cheyney, p. 856-8; Grafting solves city tree problem, p. 858; Trenton's bird-house building contest, by M. M. Burris, p. 859-60; Forestry in Dixie, p. 861-2; The forestry situation in New South Wales, p. 862-3; Enthusiasm for memorial trees, p. 863; Roadside planting as a memorial to our soldiers and sailors, by R. B. Faxon, p. 864-7; February, and plant-life still sleeps in northern climes, by R. W. Shufeldt, p. 868-75; Emergency feed from desert plants, p. 875-6; Governor Lowden endorses tree planting, p. 876; The plovers, by A. A. Allen, p. 877-80; New York forestry and reconstruction, p. 880; Digest of opinions on forestry, p. 881-8; Forestry pursuits for disabled men, p. 883-4; Letter from Chaplain Williams of the forestry units, p. 885; Old 10th engineers Hoboken sheet, p. 886-8; Tragedy of French trees, p. 888; Wooden ships, p. 888; Willow for artificial limbs, p. 888; Canadian department, by E. Wilson, p. 889-90; National lumber congress, p. 891.

Canadian forestry journal, Jan., 1919.—Coupling the forest to the fruit farm, by G. P. Melrose, p. 8-11; Why should a tree die, by B. E. Fernow, p. 11; Manitoba 75 per cent under forest, p. 13-15; Reconstruction and the call of the forests, by E. Wilson, p. 15-18; Surveying by camera from the air, by Cull, p. 20-3; A land where the forest is autocrat, by R. G. Lewis, p. 25-6; A new tree supply base in the west, p. 27-8; Our aeroplane wood reserve p. 30-1.

Hawaiian forester and agriculturist, Nov., 1918.—The Hawaiian sumach, by C. S. Judd, p. 441-2.

Hawaiian forester and agriculturist, Dec., 1918.—New forest reserves, p. 483-507.

Indian forest records, 1918.—Note on the preparation of turpentine, rosin and gum from Boswellia serrata gum-oleo-resin, by R. S. Pearson and P. Singh, p. 303-45.

Indian forester, Nov., 1918.—Forest conservancy, by E. A. Smythies, p. 501-4; Some Indian species of Zizyphus, by R. S. Hole, p. 504-8; Note on Corypha palm in North Kanara, p. 509-10; Note on the prospects of manufacturing paper pulp from Himalayan soft-woods at the present date, July, 1918, by W. Raitt, p. 510-12; Practical engineering work at the Burma forest school, Pyinamana, by A. J. Butterwick, p. 513-16; Simul plantation in jhums in Assam, by R. N. De, p. 516-19; Flowering and after of Bambusa arundinacea, by K. G. Menon, p. 519-20; A new system of timber exploitation, by C. G. Trevor, p. 525-7; Forest grazing and the Nellore "kancha" system, by C. E. C. Fischer, p. 541-7.

New York forestry, Jan., 1919.—Some suggestions for the conservation policy in New York state, by F. L. Moore, p. 5-10; Landscape forestry, by L. D. Cox, p. 11-16.

Quarterly journal of forestry, Jan., 1919.—The forestry museum at Kew, by W. Dallimore, p. 38-40; Succession in estate forestry, by W. L. Taylor, p. 40-5; Some very injurious beetles, by B. W. Adkin, p. 45-9; Developments in forestry in the west of Scotland, by G. P. Gordon, p. 49-52; The fuel wood order, 1918, dated Sept. 27, 1918, p. 61-7.

Revue des eaux et forets, Jan. 1, 1919.—L'impot forestier en Angleterre, by A. Arnould, p. 2-3.

Skogsvardsforeningens tidskrift, Sept.-Oct., 1918.—Om massafaktorenas och kubikmassans fordelning kring medelstammen (Concerning the distribution of volume factors and cubic volumes in a stand with relation to the average tree), by V. Hagelberg, p. 517-34; Traeartenes spredningsevne og kulturens taethed (The spreading ability of woody plants and the density of their culture), by L. A. Hauch, p. 535-74; Branslebristen och Skogsvarden (The scarcity of wood fuel and forest protection), by H. Petterson and others, p. 575-96; Sveriges haradsallmanningar (Sweden's hundred commons), by J. A. Amilon, p. *209-*243.

Yale School of Forestry

Established in 1900

A Graduate Department of Yale University

The two years technical course prepares for the general practice of forestry and leads to the degree of

Master of Forestry.

Special opportunities in all branches of forestry for

Advanced and Research Work.

For students planning to engage in forestry or lumbering in the Tropics, particularly tropical America, a course is offered in

Tropical Forestry.

Lumbermen and others desiring instruction in special subjects may be enrolled as

Special Students.

A field course of eight weeks in the summer is available for those not prepared for, or who do not wish to take the technical courses.

For further information and catalogue, address: The Director of the School of Forestry, New Haven, Connecticut, U. S. A.

Forestry at University of Michigan

Ann Arbor, Michigan

A FOUR-YEAR, undergraduate course that prepares for the practice of Forestry in all its branches and leads to the degree of

BACHELOR OF SCIENCE IN FORESTRY

Opportunity is offered for graduate work leading to the degree of Master of Science in Forestry.

The course is designed to give a broad, well-balanced training in the fundamental sciences as well as in technical Forestry, and has, consequently, proven useful to men engaged in a variety of occupations.

This school of Forestry was established in 1903 and has a large body of alumni engaged in Forestry work.

For announcement giving Complete information and list of alumni, address

FILIBERT ROTH

THE
NATIONAL ENGRAVING CO.

1337-1339 F STREET, N.W.
WASHINGTON, D.C.

ENGRAVERS
DESIGNERS
AND
ILLUSTRATORS

3 COLOR PROCESS WORK
ELECTROTYPES

SUPERIOR QUALITY
& SERVICE

Phone Main 8274

PLANT BLACK WALNUT

TREES

In the place of a stump

You might be getting every year a half peck of wheat, 3 pecks of potatoes or 5 quarts of corn.

No matter how green, tough, hard, big or deep-rooted the stumps may be, you can get them out quickly and cheaply with Atlas Farm Powder.

"We blew out big oak stumps easily with Atlas Farm Powder," writes Garacove Farm, North East, Md.

"I blasted the stumps on 160 acres with Atlas Farm Powder. The largest stumps were split to pieces easily," writes Fred Laughlin, Foster, Mo.

Ask your dealer for Atlas Farm Powder when you have land to clear, trees to plant, etc. Our 120-page illustrated book, "Better Farming with Atlas Farm Powder," will tell you how simple and easy it is to do the blasting. You will find the book worth dollars to you. But the coupon or a post card will bring it. Write now—before you forget.

ATLAS POWDER CO., Wilmington, Del.
Dealers everywhere. Magazine stocks near you.

ATLAS POWDER CO.
Wilmington, Del.

Send me "Better Farming with Atlas Farm Powder." I am interested in explosives for the purpose before which I mark "X."

☐ Stump Blasting
☐ Boulder Blasting
☐ Subsoil Blasting
☐ Tree Planting
☐ Ditch Digging
☐ Road Making

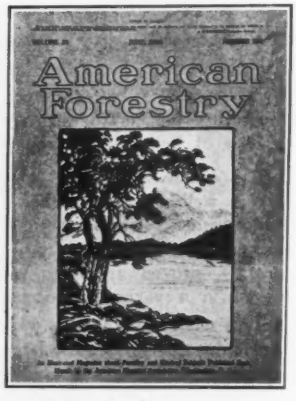
FD 5

Name _____

Address _____

Atlas Farm Powder
THE SAFEST EXPLOSIVE
The Original Farm Powder

PLANT TREES
PROTECT FORESTS
USE FORESTS



This is the only Popular National Magazine devoted to trees and forests and the use of wood.

American Forestry Association

1410 H STREET N. W., WASHINGTON, D. C.

*I hereby accept membership in The American Forestry Association and enclose check for $*_____

NOTE—American Forestry Magazine, a handsomely printed and illustrated monthly, is sent to all except $1.00 members, or without membership the subscription price is $3.00 a year.

CLASS OF MEMBERSHIP

Subscribing Membership		$ 3.00
Contributing	"	10.00
Sustaining	"	25.00
Life	"	100.00
Patron	"	1000.00
Annual Membership, without Magazine		1.00

Canadian Postage 25c extra; Foreign Postage, 50c extra.
($2.00 of the fee is for AMERICAN FORESTRY.)

*Name*_____

*Street*_____

*City*_____

PLANT MEMORIAL TREES